ENVIRONMENTAL ASSESSMENT, FINDING OF NO SIGNIFICANT IMPACT AND RECORD OF DECISION

FOR

BIRD DAMAGE MANAGEMENT IN THE OKLAHOMA WILDLIFE SERVICES PROGRAM

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1.0 CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

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1.1 Introduction

USDA/APHIS/ Wildlife Services (WS)[1] is authorized by Congress to manage a program to reduce human/wildlife conflicts. WS's mission is to "provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and to safeguard public health and safety." This is accomplished through:

A) training of wildlife damage management professionals;
B) development and improvement of strategies to reduce economic losses and threats to humans from wildlife;
C) collection, evaluation, and dissemination of management information;
D) cooperative wildlife damage management programs;
E) informing and educating the public on how to reduce wildlife damage and;
F) providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1989).

This Environmental Assessment (EA) evaluates ways by which this responsibility can be carried out to resolve conflicts with bird species in Oklahoma.

WS is a cooperatively funded and service oriented program. Before any operational wildlife damage management is conducted, Agreements for Control or WS Work Plans must be signed by WS and the land owner/administrator. WS cooperates with private property owners and managers and with appropriate land and wildlife management agencies, as requested, with the goal of effectively and efficiently resolving wildlife damage problems in compliance with all applicable federal, state, and local laws.

Individual actions on the types of sites encompassed by this analysis are normally categorically excluded under the APHIS Implementing Regulations for compliance with the National Environmental Policy Act (NEPA) as described in the Code of Federal Regulations (CFR) 7, 372.5(c). APHIS Implementing Regulations also provide that all technical assistance furnished by WS is categorically excluded (7 CFR 372.5(c) and 60 Federal Register 6,000, 6,003 (1995)). Bird damage management is an important function of the Oklahoma WS program, and in recognizing this fact, Oklahoma WS (OK WS) has prepared this EA to assist in planning bird damage management (BDM) activities and to clearly communicate with the public the analysis of cumulative impacts for a number of issues of concern in relation to alternative means of meeting needs for such management in the State. This analysis covers WS's plans for current and future BDM actions wherever they might be requested within the State of Oklahoma.

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[1] As of August 1, 1997, the name of the USDA, APHIS Animal Damage Control (ADC) Program was changed to Wildlife Services (WS). All references to WS are considered synonymous to WS.

1.2 Purpose

The purpose of this EA is to analyze the effects of WS activities in Oklahoma to manage damage caused by bird species or species groups that include, but are not necessarily limited to, the following: European starlings (*Sturnus vulgaris*), blackbirds (the blackbird group, Subfamily Icterinae), house or English sparrows (*Passer domesticus*), feral domestic pigeons (*Columbia livia*), crows and jays (family Corvidae), egrets and herons (family Ardeidae) , woodpeckers (family Picidae), gulls (Lauridae), cormorants (Phalacrocoracidae), geese (family Anatidae, subfamily Anserinae), ducks (family Anatidae, subfamily Anatinae), coots (*Fulica americana*), swallows (family Hirundinidae), owls (order Strigiformes), and raptors including hawks, kites, vultures (order Falconiformes). Resources protected by such activities include agricultural crops, turf, livestock feed, livestock, livestock health, property, threatened and endangered species, other wildlife, aquaculture, and human health and safety. Hereinafter, blackbirds refers to the blackbird group as described in the FEIS prepared by the WS program (USDA 1997). The blackbird group comprises the Subfamily Icterinae, including red-winged (*Agelaius phoeniceus*), rusty (*Euphagus carolinus*), Brewer's (*E. cyanocephalus*), and yellow-headed blackbirds (*Xanthocephalus xanthocephalus*); brown-headed cowbird (*Molothrus ater*); great-tailed grackle (*Cassidix mexicanus*), and common grackle (*Quiscalus quiscula*).

1.3 Need For Action

1.3.1 Summary of Proposed Action

The proposed action is to continue the current portion of the WS program in Oklahoma that responds to requests for BDM to protect human health and safety, agricultural resources, crops, turf, landscaping, livestock feed, livestock, livestock health, property, natural resources, threatened and endangered species, other wildlife, forestry and aquaculture in the State of Oklahoma. A major component of BDM in the OK WS program has the goal of minimizing threats and/or hazards to human health and safety from birds and to minimize the loss or the risk of loss of agricultural crops from wintering crows and geese. The program would also operate to reduce or minimize the loss of livestock feed and the risk of bird-related livestock health problems presented by starlings and blackbirds at requesting dairies and feedlots. Program goals are also to minimize damage or the risk of damage to other agricultural resources, other wildlife species, property, or other public or private resources from birds. To meet these goals WS would have the objective of responding to all requests for assistance with, at a minimum, technical assistance or self-help advice, or, where appropriate and when cooperative or congressional funding is available, direct control assistance in which professional WS personnel conduct damage management actions. An Integrated Wildlife Damage Management (IWDM) approach would be implemented which would allow use of any legal technique or method, used singly or in combination, to meet requestor needs for resolving conflicts with birds. Agricultural producers and others requesting assistance would be provided with information regarding the use of effective nonlethal and lethal techniques. Lethal methods used by WS would include shooting, trapping, egg addling/destruction, DRC-1339

(Starlicide), Avitrol, or euthanasia following live capture by trapping or use of the tranquilizer alpha-chloralose (A-C). Nonlethal methods used by WS may include porcupine wire deterrents, wire barriers and deterrents, the tranquilizer A-C, chemical repellents (e.g., methyl anthranilate, polybutene products), and harassment. In many situations, the implementation of nonlethal methods such as exclusion-type barriers would be the responsibility of the requestor to implement. BDM by WS would be allowed in the State, when requested, on private property sites or public facilities where a need has been documented, upon completion of an Agreement for Control. All management actions would comply with appropriate federal, state, and local laws.

1.3.2 Need for Bird Damage Management to Protect Human Health and Safety

Feral domestic pigeons and starlings have been suspected in the transmission of 29 different diseases to humans, (Rid-A-Bird 1978, Weber 1979, and Davis et.al. 1971). These include viral diseases such as meningitis and seven different forms of encephalitis; bacterial diseases such as erysipeloid, salmonellosis, paratyphoid, Pasteurellosis, and Listeriosis; mycotic (fungal) diseases such as aspergillosis, blastomycosis, candidiasis, cryptococcosis, histoplasmosis, and sarcosporidiosis; protozoal diseases such as American trypansomiasis and toxoplasmosis; and rickettsial/chlamydial diseases such as chlamydiosis and Q fever. As many as 65 different diseases transmittable to humans or domestic animals have been associated with pigeons, starlings, and English sparrows (Weber 1979) (Appendix B). The risk of disease transmission from birds is a major reason for conducting BDM.

Historically, Oklahoma has been a summer destination for migrant cattle egrets (*Bubulcus ibis*) and several ally bird species, e.g. little blue herons (*Egretta caerulea*), snowy egrets (*Egretta thula*) and great egrets (*Casmerodius albus*). Rookeries established throughout Oklahoma have been reported to create potential human health conflicts. Histoplasmosis, along with other bird induced airborne particles has been associated with rookeries in Oklahoma (Grant et al. 1995). Psittacosis-ornithosis (chlamydiosis) agents have been isolated within egret rookeries in Texas and several members of a bird banding team contracted the disease after working in a rookery (Telfair 1983).

Each year, Oklahoma attracts several hundred pairs of nesting Mississippi kites. According to data compiled by the annual Breeding Bird Survey (BBS), west-central Oklahoma supports one of the largest concentrations of nesting Mississippi kites in the United States (Sauer et al. 2001). Kites arrive in the state in early April and remain through early September, following the fledging of their young. In about 20% of cases, the natural instincts displayed by kites protecting nest sites from perceived depredation will create a threat or risk to human safety. Kites intuitively dive, swoop and emit distress calls to fend off potential threats to eggs, nests, or young. During the time period FY 1998-FY 2001, twenty-six occurrences of kite/human conflicts were reported to the OK WS program through the Oklahoma WS Management Information System (OK MIS).[2]

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[2] The Oklahoma Wildlife Services Management Information System (OK MIS) is a computerized database used to track program activities.

Several incidents resulting in skin and scalp lacerations to humans requiring medical attention have been documented on a golf course in [redacted], Oklahoma (P. Robinson, pers. commun., 2002).

Many times, individuals or property owners that request assistance with feral domestic pigeon or nuisance blackbird or starling roost problems are concerned about potential disease risks but are unaware of the types of diseases that can be associated with these birds. In many situations, BDM is requested because the droppings left by concentrations of birds is aesthetically displeasing and can result in continual clean-up costs.

Further problems arise as many Canada geese have become non-migratory due to suitable local habitats and successful wildlife management programs. These resident geese are becoming more and more of a nuisance around public parks, lakes, and golf courses. The threat to human health from large amounts of droppings is increased (Cleary and Dolbeer 1999).

1.3.3 Need for Bird Damage Management at Airports

The risk that birds pose to aircraft is well documented with the worst case reported in Boston in 1960 when 62 people were killed in the crash of an airliner which collided with a flock of starlings (Cleary and Dolbeer 1999).

In Oklahoma, several significant incidents involving wildlife conflicts with aircraft are documented:

> In 1989, an Oklahoma Air National Guard C-130 Aircraft hit a group of cattle egrets at Will Rogers World Airport in OKC. Total damages to the propellers and engines were $5,156 (BASH 1999).
>
> In FY 2000, an MD 80 passenger airliner struck a gull on approach at Will Rogers World Airport. Damages to the aircraft totaled $39,000 (FAA 2002).
>
> From 1985-1986 at Vance Air Force Base, OK, 589 bird strikes were reported that resulted in $236,098 in damages (BASH 1999).
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> At Altus Air Force Base, OK., 242 bird strikes were reported during 1999-2000, resulting in damages totaling $430,582.87. One incident alone was a strike to a C-17 transport plane resulting in $77,001 in damages (E. Cowan, pers. commun., 2002). Another strike involving a Canada goose resulted in $92,000 in damages to the aircraft.

To date, no documented wildlife strikes have resulted in loss of human life in Oklahoma; however, strikes continue to occur, increasing the risk for a catastrophic event. Such was the case at Elmendorf AFB, AK in September 1995 where 24 human lives were lost as a

result of an "AWACS" aircraft crash after ingesting four Canada geese during takeoff (Cleary and Dolbeer 1999).

1.3.4 Need for Bird Damage Management at Cattle Feeding and Dairy Cattle Facilities

Blackbirds, starlings, English sparrows, and feral domestic pigeons often cause damage at cattle feeding facilities and dairies by congregating in large numbers to feed on the grain component of cattle feed. The birds also cause damage by defecating on fences, shade canopy structures, and other structures, which can accelerate corrosion of metal components and which generally is considered an unsightly nuisance and potential health hazard for the feedlot/dairy operators and their personnel.

Contribution of Livestock and Dairies to the Economy: Livestock and dairy production in Oklahoma contributes substantially to local economies. The total inventories for the major classes of livestock in Oklahoma during 2000 included 5,050,000 cattle valued at 3.2 billion dollars (910,000 were in feedlots), 2,310,000 swine valued at 161.5 million dollars, and 55,000 head of sheep, valued at 6.3 million dollars. Statewide, there were 91,000 milk cows valued at $112,840,000. OK dairy farmers produced 1.3 billion pounds of milk, generating 174 million dollars in cash receipts in 2000 (OASS 2001).

Scope of Livestock Feed Losses: The problem of starling damage to livestock feed has been documented in France and Great Britain (Feare 1984), and in the United States (Besser et. al. 1968). The concentration of larger numbers of cattle eating huge quantities of feed in confined pens results in a tremendous attraction to starlings, blackbirds, and feral domestic pigeons. Diet rations for cattle contain all of the nutrients and fiber that cattle need, and are so thoroughly mixed that cattle are unable to select any one component over others. The basic constituent of most rations is silage and the high energy portion is usually provided as barley, which may be incorporated as whole grains, crushed or ground cereal. While cattle cannot select individual ingredients from that ration, starlings can and do select the barley, thereby altering the energetic value of the complete diet. The removal of this high energy fraction by starlings, is believed to reduce milk yields, weight gains, and is economically significant (Feare 1984). Glahn and Otis (1986) reported that starling damage was also associated with proximity to roosts, snow, and freezing temperatures and the number of livestock on feed.

The economic significance of feed losses to starlings has been demonstrated by Besser et. al (1968) who concluded that the value of losses in feedlots near Denver, Colorado was $84 per 1,000 birds in 1967. Forbes (1995) reported starlings consume up to 50% of their body weight in feed each day. Glahn and Otis (1981) reported losses of 4.8 kg of pelletized feed consumed per 1,000 bird minutes. Glahn (1983) reported that 25.8% of farms in Tennessee experienced starling depredation problems of which 6.3% experienced significant economic loss. Williams (1983) estimated seasonal feed losses to five species of blackbirds (primarily brown-headed cowbirds) at one feedlot in south Texas at nearly 140 tons valued at $18,000. A dairy in [redacted], OK reported $20,000 in losses to

livestock feed as a result of feeding and contamination by feces from European starlings (OK MIS).

An analysis of blackbird and starling depredation at 10 cattle feeding facilities in Arizona that used WS BDM services conservatively estimated that the value of feed losses on the 10 facilities would have been about $120,000 without WS BDM services which cost approximately $40,000/yr (USDA 1996).

Scope of Livestock Health Problems: A number of diseases that affect livestock have been associated with feral domestic pigeons, starlings, blackbirds, and English sparrows (Weber 1979, Appendix C).

A dairy producer in central Oklahoma experienced problems with flocks of starlings and blackbirds which contributed to the development of diarrhea in cattle exposed to contaminated feed from bird droppings, resulting in a loss of milk production averaging 5,000 lbs. per day. An increase in the numbers of aborted calves by infected cows was observed and was attributed to the contaminated feed.

1.3.5 Need for Bird Damage Management to Protect Agriculture Crops

From FY-1999 to FY-2001, there were 229 bird damage incidents reported to WS in Oklahoma affecting a variety of resources including sunflower, wheat, pecans, watermelons, corn, oats, peanuts, milo and other agricultural products from starlings, blackbirds, crows, geese, sandhill cranes and other birds (OK MIS).

Migratory and resident geese can cause considerable damage to crops, particularly winter wheat. Wheat is a major crop in Oklahoma, not only for the production of grain, but also as a winter grazing forage for livestock (OASS). The overall populations of geese in North America have experienced a drastic increase over the last few years (Cleary and Dolbeer 1999). Large flocks of birds will often congregate on winter wheat fields to feed and to take advantage of the large open spaces that the fields offer as a safety/defense strategy. Damage to the wheat crop during feeding by geese can be quite extensive; geese often pluck the plant from the ground during feeding rather than clipping off the vegetative portion of the plant. During FY 1999-2001, twenty-eight incidents of goose damage to winter pastures were reported with a damage value of $80,625 (OK MIS).

Several studies have shown that blackbirds and starlings can pose a significant economic threat to agricultural producers (Besser et. al. 1968, Dolbeer et.al. 1978, and Feare 1984). Studies have shown that blackbirds have caused damages ranging from $4-11 million to sunflower crops in North Dakota, South Dakota and Minnesota annually. On occasion, blackbirds have destroyed entire fields of sunflowers in a few days. During the winter months, the natural migration patterns of blackbirds concentrate large numbers of blackbirds in Oklahoma.

Historically, Oklahoma has been a major winter destination for migrating crows. Subsequently established winter roosts could contain millions of crows concentrated in

some areas (Johnson 1994). Roosts presently exist in several locations throughout the state. As a result of concentrated crows and their feeding activities, several agricultural commodities including pecans and peanuts suffer losses. From FY 1999 - FY 2001, pecan losses attributable to crows exceeded $140,000 / year (OK MIS).

1.3.6 Need for Bird Damage Management to Reduce Depredation to Livestock and Poultry

Vultures, hawks, crows and some gulls commonly scavenge carcasses. In some circumstances, they may attack live animals and kill those that are unable to escape or defend themselves. Initial attacks by these birds are usually at the eyes, nose, navel, and anal area. Typically, they blind animals by pecking out the eyes, even if they do not kill them (Wade and Bowns 1985). Incidents of predation upon commercially raised game birds, poultry, zoo animals and livestock have been documented in Oklahoma.

From FY 1998 – FY 2001, black vultures were responsible for the injuries and subsequent death of nine adult cattle, thirty-six calves and twenty goats (OK MIS). These numbers only represent those incidents investigated by WS and do not account for losses not reported to WS.

1.3.7 Need for Bird Damage Management to Protect Property

Birds occasionally damage structures on private property or public facilities with fecal contamination. Accumulated bird droppings can reduce the functional life of some building roofs by 50% (Weber 1979). Woodpeckers sometimes cause structural damage to wood siding and stucco on homes. Corrosion damage to metal structures and painted finishes, including those on automobiles and aircraft, can occur because of uric acid from bird droppings. Several incidents involving bird droppings on aircraft in maintenance hangars on Oklahoma Air Force bases have created concern. Estimates of aircraft skin repairs on a KC-135 aircraft range from $10,000-$15,000 in replacement materials with an additional estimated 1000 hrs labor at $95/hr. required for a full wing repair. Spot repairs can be expected to require $3000-$4000 in materials with approximately 50 hrs. of labor at $95/hr. (C. Baker pers.commun., 2002)

Rookeries, or nesting colonies, are established by egret and heron species, including cattle egrets, great egrets, little blue herons, snowy egrets, throughout Texas and Oklahoma. These nesting sites can encompass areas between 0.1 and 5 ha in size. Egret activities can be destructive to desirable trees, shrubs and other vegetation at these sites. Defoliation of the plants by bird movements through the canopy, removal of plant material for nest building, covering of leaves by droppings, and drastic increases in soil nutrients from bird droppings will destroy the vegetative community in one to twelve years, depending on the plant species present (Telfair et al. 1986, Grant et al.1995).

Electrical utility companies frequently have problems with birds and other animals causing power outages by shorting out transformers and substations. These power outages can be a major financial burden for utility companies and cooperatives. These problems are not

only from the direct activities of nesting birds at substations; snakes are attracted to these areas due to the high concentration of prey items such as eggs and young birds. As snakes depredate nests they inadvertently cross high voltage lines and cause power outages (James et al. 1999). Towers may provide roosting locations for vultures.

WS has been contacted regarding excessive pigeon droppings at highway toll booths. Estimated annual costs for power washing and providing general clean up for affected sites statewide cost $5000. (OK MIS)

Feral domestic and wild waterfowl sometimes congregate at golf courses, parks, and other recreational areas that have ponds or watercourses and cause damage by grazing on turf and the accumulation of droppings. A golf course manager in [redacted], OK reported $50,000 in damages to golf greens and fairway turf from the feeding activities of a small flock of resident Canada geese (OK MIS)

1.3.8 Need for Bird Damage Management to Protect Aquaculture

Aquaculture in Oklahoma consists largely of management agencies such as the Oklahoma Department Wildlife Conservation (ODWC) and the U.S. Fish and Wildlife Service (USFWS). Occasionally, fish-eating birds such as various species of herons and egrets (order Ciconiiformes, family Ardeidae), double-crested cormorants (*Phalacrocorax auritus*), herring gulls (*Larus argentatus*), ring-billed gulls (*Larus delawarensis*), ospreys (*Pandion haliaetus*), and others prey on young fry and fingerlings, adult fish ready for stocking, or brood fish at these fish rearing facilities. Although not a widespread problem in the State, WS could be requested to assist in resolving such problems. In most cases like these, WS only provides advice (technical assistance) to the facility operators on how to resolve such problems through primarily nonlethal means such as barrier/deterrent wires or harassment. In some cases, the producer or facility might need to obtain a depredation permit from the USFWS to kill a few of the birds to reinforce the remaining birds' fear of harassment and exclusionary techniques. Under the proposed action, WS could also be requested to provide on-site operational assistance involving the use of nonlethal and lethal means of resolving bird damage problems at these or similar facilities. Lethal methods would generally be restricted to taking only a few birds to reinforce the remaining birds' fear of harassment and exclusionary techniques.

In 1998, census data indicated that the total sales for aquaculture products was $3,639,000 for the Oklahoma aquaculture industry. Of that number, $403,000 in sales was attributed to food fish production (USDA 1998). Oklahoma catfish producers cited in a 1992 survey that the most serious problem that they faced was bird depredation to their resource (Simmons et al. 1995).

1.3.9 Need for Bird Damage Management to Protect Wildlife Including T&E Species

Some of the species listed as threatened or endangered under the Endangered Species Act of 1973 (ESA) are preyed upon or otherwise adversely affected by certain bird species.

The nests of several endangered birds are frequently parasitized by brown-headed cowbirds. Some of the endangered birds that are negatively affected by brown-headed cowbirds are the black-capped vireo and the southwestern willow flycatcher (Brown 1994; USFWS 1995). The cowbirds lay their eggs in active nests of other bird species. Cowbirds are known to lay eggs in the nests of more than 100 different bird species. Each female will lay as many as 40 eggs per year in surrogate nests (Cornell 1999). The cowbird eggs hatch first and the young are cared for by the host bird as if they were its own. By the time the host birds' own eggs hatch, the cowbird young are larger and out-compete the host birds' young for food and frequently push them out of the nest. With endangered bird species, such parasitism can cause enough nest failures to jeopardize the host species. A number of agencies, including WS in Arizona, California and Texas, have historically utilized cowbird trapping and other population control measures in certain areas (e.g., at feedlots and roost locations) successfully for the purpose of reducing nest parasitism.

Direct predation has been shown to seriously limit the recovery of endangered bird species, particularly ground nesting birds. Interior least terns and piping plovers are endangered species in Oklahoma that could be subjected to damage from predators. Studies have been conducted in other states to determine population trends of least terns and piping plovers and these studies have shown that predation plays a significant role in nest losses (Kirsch 1993). Birds of prey, as well as mammalian carnivores, kill adult California least terns and their young, and destroy nests in nesting colonies of this endangered species. The California WS program traps raptors in a number of these areas at the request of land managing agencies to protect this species and allow for successful reproduction (Butchko et.al 1992). In California, bird species known as potential threats to the long term nesting success of terns include red-tailed hawks, great-horned owls, American kestrels, Northern harriers and burrowing owls (J. Steuber, pers. commun. 2002). Black-crowned night herons are another potential predator to terns and plovers (Kirsch 1993). Interior least terns are present in the Arkansas/Red River Ecosystem from April through August. Small nesting colonies may be found on salt flats, reservoir beaches, and river sandbars in the larger rivers in the state, and at the Salt Plains National Wildlife Refuge near Jet, Oklahoma (USFWS 2002)

Prairie chickens were once common birds in western Oklahoma. A lack of quality habitats, along with other factors have contributed to a decline in prairie chicken numbers over time. The prairie chicken is currently at a critical period for long-term survival (Bidwell et.al 1995) The lesser prairie chicken has been listed as a species "warranted but precluded" for listing under the ESA. Some research has shown that management of predator species can enhance prairie chicken recruitment. Primary predators of lesser prairie chickens are red-tailed hawks, rough-legged hawks, ferruginous hawks, prairie falcons, great horned owls, golden eagles and northern harriers (Schroeder et.al. 2001)

The ecology of aquatic environments and available water supplies for human consumption may be threatened as a result of concentrated numbers of geese defecating in and/or near water sources, increasing the bacteria and nutrient levels in the water and providing a possible introduction of disease organisms, such as Salmonella (Lyons 1995). In some Arizona cities, urban pond managers observed that high domestic duck and goose

populations in ponds created an "over-fertilized" condition from the abundance of feces in pond water. This condition gave rise to high algae blooms and decomposing organic matter that robbed the water of oxygen for fish populations. Removal of excess numbers of resident waterfowl from the ponds restored proper oxygen and pH levels to the water. (W. Servoss pers. commun., 2002)

1.4 Relationship of This Environmental Assessment To Other Environmental Documents

WS has issued a Final Environmental Impact Statement on the national APHIS/WS program (USDA 1997). This EA is tiered to the Final EIS. Pertinent information available in the FEIS has been incorporated by reference into this EA.

1.5 Decision To Be Made

Based on the scope of this EA, the decisions to be made are:

- Should BDM as currently implemented by the WS program be continued in the State?
- If not, how should WS fulfill its legislative responsibilities for managing bird damage in the State?
- Might the continuing of WS's current program of BDM have significant impacts requiring preparation of an EIS?

1.6 Scope of This Environmental Assessment Analysis

1.6.1 Actions Analyzed

This EA evaluates bird damage management by WS to protect human health and safety, agricultural resources, crops, turf, landscaping, livestock feed, livestock, livestock health, property, natural resources, threatened and endangered species, other wildlife, forestry and aquaculture on private land or public facilities within the State, or wherever such management is requested from the WS program.

1.6.2 Period for Which this EA is Valid

This EA will remain valid until WS determines that new needs for action or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document will be reviewed and revised as necessary. This EA will be reviewed each year to ensure that it is complete and still appropriate to the scope of the State BDM activities.

1.6.3 Site Specificity

This EA analyzes potential impacts of WS's BDM activities that will occur or could occur at private property sites, public facilities or other locations within Oklahoma. Because the proposed action is to continue the current program, and because the current program's goal and responsibility is to provide service when requested within the constraints of available funding and personnel, it is conceivable that BDM activity by WS could occur anywhere in the State. However, the location of every bird damage management need that will occur and result in a request for assistance to WS cannot be predicted. Planning for the management of bird damage must be viewed as being conceptually similar to federal or other agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, insurance companies, etc. Although some of the sites where bird damage problems will occur can be predicted, all specific locations or times where such problems will occur in any given year cannot be predicted. Thus, this EA analyzes the potential impacts of BDM efforts wherever and whenever they might occur as part of the current program. The EA emphasizes significant issues as they relate to specific areas whenever possible. However, the issues that pertain to the various types of bird damage and resulting management are the same, for the most part, wherever they occur, and are treated as such. The standard WS Decision Model (Slate et al. 1992) and WS Directive 2.105 is the routine undocumented thought process that is the site-specific procedure for determining methods and strategies to use or recommend for individual actions conducted by WS in the State (See Appendix F, also USDA 1997, Chapter 2 and Appendix N). Decisions made using this thought process will be in accordance with any mitigation measures and standard operating procedures described herein and adopted or established as part of the decision.

1.7 AUTHORITY AND COMPLIANCE

1.7.1 Authority of Federal and State Agencies in Bird Damage Management in Oklahoma

1.7.1.1 WS Legislative Authority

The primary statutory authority for the WS program is the Act of March 2, 1931 (7 U.S.C. 426-426B and 426C, as amended. It provides for WS to conduct programs to protect a variety of resources from injurious animals, including birds.

In Oklahoma, WS, in accordance with the provisions of Title 29, O.S.2001, §5-201, and 5-502, is authorized and permitted to take necessary action in assisting any landowner in the management and control of nongame birds, feral pigeons and other wildlife species on their property.

1.7.1.2 Oklahoma Department of Wildlife Conservation (ODWC)

The ODWC is authorized by Title 29, O.S.2001, §3-103, Part 9, to "Prescribe the manner of cooperation with....any agency of the Federal government....any other agency or organization in the study of conservation and propagation of Wildlife..." and in Part 14, to "regulate the season and harvest of wildlife". A Memorandum of Understanding (MOU) between WS and ODWC states that WS shall have primary responsibility in dealing with all nuisance and damage complaints related to migratory birds in Oklahoma. ODWC shall have primary responsibility in dealing with resident waterfowl and gamebird (turkey, pheasant, quail) complaints.

1.7.1.3 Oklahoma Department of Agriculture, Food and Forestry (ODAFF)

ODAFF is authorized by Title 2, O.S.2001,§12-1, A, to enter into cooperative agreements for the purpose of "...conducting wildlife damage management for...other wildlife species causing destruction to livestock, poultry, crops, range land, forests and other resources, including human health and safety". It further states that "Wildlife damage management of ...other wildlife species causing damage shall include but not be limited to hunting, trapping, or other practical methods for the control of wildlife damage".

1.7.1.4 Oklahoma State Department of Health (OSDH)

The OSDH has the authority to enter into an MOU or agreement with WS for conducting BDM for the protection of human health from wildlife threats, and could enter into an MOU or agreement with WS to conduct such activities.

1.7.1.5 U.S. Fish and Wildlife Service (USFWS)

The USFWS is responsible for managing and regulating take of bird species that are listed as migratory under the Migratory Bird Treaty Act and those that are listed as threatened or endangered under the Endangered Species Act. Sections 1.7.2.2, 1.7.2.3, 1.7.2.6 and 1.7.2.7 below describe WS's interactions with the USFWS under these laws and Executive Orders.

1.7.2 COMPLIANCE WITH OTHER FEDERAL LAWS

Several other federal laws authorize, regulate, or otherwise affect WS wildlife damage management activities. WS complies with these laws, and consults and cooperates with other agencies as appropriate.

1.7.2.1 National Environmental Policy Act (NEPA)

WS prepares analyses of the environmental impacts of program activities to meet procedural requirements of this law. This EA meets the NEPA requirement for the proposed action in Oklahoma. When WS operational assistance is requested by

another federal agency, NEPA compliance is the responsibility of the other federal agency.

1.7.2.2 Endangered Species Act (ESA)

It is federal policy, under the ESA, that all federal agencies shall seek to conserve threatened and endangered (T&E) species and shall utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). WS conducts Section 7 consultations with the U.S. Fish & Wildlife Service (USFWS) to use the expertise of the USFWS to ensure that "any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency shall use the best scientific and commercial data available" (Sec.7(a)(2)). WS obtained a Biological Opinion (B.O.) from USFWS in 1992 describing potential effects on T & E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, Appendix F). WS initiated formal consultation with the USFWS on several species not covered by the 1992 B.O. and the results of that consultation are pending. In addition, WS is in the process of initiating formal consultation at the programmatic level to reevaluate the 1992 B.O. and to fully evaluate potential effects on T&E species listed or proposed for listing since the 1992 FWS B.O. In 1999, Oklahoma WS entered into an informal consultation with the USFWS to address additional T/E species in Oklahoma that were not included in the original 1992 B.O. At that time a Biological Assessment was prepared (Appendix D) to evaluate potential impacts to those species.

1.7.2.3 Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711; 40 Stat. 755), as amended

The Migratory Bird Treaty Act provides the USFWS regulatory authority to protect species of birds that migrate outside the United States. The law prohibits any "take" of bird species, eggs and nests and possession of birds or bird parts by private entities, except as permitted by the USFWS; therefore the USFWS issues permits to private entities for reducing bird damage. As a result of Executive Order 13186 of January 10, 2001, Responsibilities of Federal Agencies to Protect Migratory Birds, (Section 1.7.2.7 below) a draft MOU is being developed by WS at this time with the USFWS for the purpose of migratory bird conservation.

WS may provide on-site assessments for persons experiencing migratory bird damage to obtain information on which to base damage management recommendations. Damage management recommendations could be in the form of technical assistance or operational assistance. When appropriate, WS may provide recommendations to the USFWS for the issuance of depredation permits to private entities to resolve a bird damage problem. The ultimate responsibility for issuing such permits rests with the USFWS (50 CFR 21.41). Starlings, feral domestic pigeons, house sparrows and domestic waterfowl are not classified as protected migratory birds and therefore have no protection under this Act. USFWS

depredation permits are not required to kill yellow-headed, red-winged, rusty, and Brewer's blackbirds, cowbirds, all grackles, crows, or magpies found committing or about to commit depredation upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance. Also, double-crested cormorants may be taken without a permit if depredating or about to depredate on aquaculture stocks at commercial aquaculture facilities. Based on evidence that migratory game birds have accumulated in such numbers to threaten or damage agriculture, horticulture or aquaculture, the Director of the USFWS is authorized to issue a depredation order to permit the killing of such birds (50 CFR 21.42-47).

1.7.2.4 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. All chemical methods used or recommended by the WS program in Oklahoma are registered with and regulated by the EPA and ODAFF and are used by WS in compliance with labeling procedures and requirements.

1.7.2.5 National Historic Preservation Act (NHPA) of 1966 as amended

The National Historic Preservation Act (NHPA) of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that can result in changes in the character or use of historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian tribes to determine whether they have concerns for traditional cultural properties in areas of these federal undertakings. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties. WS activities as described under the proposed action do not cause ground disturbances nor do they otherwise have the potential to significantly affect visual, audible, or atmospheric elements of historic properties and are thus not undertakings as defined by the NHPA. BDM could benefit historic properties if such properties were being damaged by birds. In those cases, the officials responsible for management of such properties would make the request and would have decision-making authority over the methods to be used. Harassment techniques that involve noise-making could conceivably disturb users of historic properties if they were used at or in close proximity to such properties; however, it would be an exceedingly rare event for noise-producing devices to be used in close proximity to such a property unless the resource being protected from bird damage was the property itself, in which case the primary effect would be beneficial. Also, the use of such devices is generally short term and could be discontinued if any

conflicts with historic properties arose. WS has determined BDM actions are not undertakings as defined by the NHPA because such actions do not have the potential to result in changes in the character or use of historic properties. A copy of this EA is being provided to each American Indian tribe in the State to allow them opportunity to express any concerns that might need to be addressed prior to a decision.

1.7.2.6 Bald Eagle Protection Act of 1940 (16 U.S.C., 668-668d) as amended

The Bald Eagle Protection Act of 1940 allows for the protection and preservation of bald eagles and golden eagles by prohibiting, except under certain specified conditions, the taking, possession and commerce of these birds. The Secretary of the Interior can permit the taking, possession and transportation of specimens for scientific or exhibition purposes or for the religious purposes of Native American Tribes if the action is determined to be compatible with the preservation of the bald or golden eagle.

BDM could benefit eagles by providing protection from a direct wildlife threat to birds, nests or eggs by predation or disease, protection to individuals from being killed by aircraft strikes, or prevent eagles from being killed illegally by frustrated or careless individuals experiencing eagle damage or damage threats to resources. Although presumed to be limited in Oklahoma, depredation to livestock and wildlife by eagles has been documented in other states. Generally, depredation to livestock is associated with golden eagles. Any interaction with eagles by WS is further tempered by WS Policy (ADC Directive 2.315, 1993)

1.7.2.7 Executive Order 13186 of January 10, 2001, Responsibilities of Federal Agencies to Protect Migratory Birds

Directs Federal agencies taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations to develop and implement, within 2 years, a Memorandum of Understanding (MOU) with the Fish and Wildlife Service that shall promote the conservation of migratory birds.

1.7.2.8 Executive Order 13112 of February 3, 1999, Invasive Species

Nonnative plants and animals that inadvertently find their way to the U.S. are of increasing concern as they threaten our natural resources. One study estimates that the total costs of invasive species in the United States amount to more than $138 billion each year (Pimentel et. al., 1999). Invasive species impact nearly half of the species currently listed as Threatened or Endangered under the U.S Federal Endangered Species Act.

On February 3, 1999, Executive Order 13112 was signed establishing the National Invasive Species Council (Council). The Council is an inter-Departmental body that helps to coordinate and ensure complementary, cost-effective Federal activities regarding invasive species. Council members include the Departments of the Interior, Agriculture, Commerce, State, Treasury, Transportation, Defense, and

Health and Human Services, and the Environmental Protection Agency, and the U.S. Agency for International Development. Together with the Invasive Species Advisory Committee, stakeholders, concerned members of the public, and member departments, the Council formulated an action plan for the nation. The Council issued the National Invasive Species Management Plan early in 2001 to provide an overall blueprint for Federal action. The Plan recommends specific action items to improve coordination, prevention, control and management of invasive species by the Federal agency members of the Council.

1.7.2.9 Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."

Environmental Justice (EJ) is a movement promoting the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. EJ, also known as Environmental Equity, has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status.

EJ is a priority both within APHIS and WS. Executive Order 12898 requires Federal agencies to make EJ part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low-income persons or populations. APHIS plans to implement Executive Order 12898 principally through its compliance with the provisions of NEPA.

All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898 to insure EJ. WS personnel use wildlife damage management methods as selectively and environmentally conscientiously as possible. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations.

2.0 CHAPTER 2: DISCUSSION OF ISSUES

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental impacts analysis in Chapter 4 (Environmental Consequences), issues that have driven the development of mitigation measures and/or standard operating procedures, and issues that will not be considered in detail, with rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop mitigation measures. Additional affected environments will be incorporated into the discussion of the environmental impacts in Chapter 4.

2.1 Issues: The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on Target Bird Species Populations
- Effects on Nontarget Species Populations, including T&E Species
- Effects on Human Health and Safety
- Effects on Aesthetics
- Humaneness of Lethal Bird Control Methods

2.2 Issues Addressed in the Analysis of Alternatives

2.2.1 Effects on Target Bird Species Populations

A common concern among members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA are the primary ones which may be affected by WS's BDM activities in OK which are species of which more than just a few individuals would likely be killed by WS's use of lethal control methods under the proposed action in any one year. Those species include European starlings, House or English sparrows and feral domestic pigeons. These are non-indigenous exotic species. Other species that have been killed in limited numbers include: blackbirds, egrets, vultures, hawks, geese, and crows. Also, there may be concerns about potential adverse impacts from WS's harassment of nesting egrets in urban areas during spring, and the taking of Mississippi kite nests, eggs and young. This analysis will address those impacts as well.

2.2.2 Effects on Nontarget Species Populations, Including T&E Species

A common concern among members of the public and wildlife professionals, including WS personnel, is the potential impacts of damage control methods and activities on nontarget species, particularly Threatened and Endangered Species. WS's standard operating procedures include measures intended to mitigate or reduce the effects on nontarget species populations and are presented in Chapter 3.

Special efforts are made to avoid jeopardizing Threatened and Endangered Species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has programmatically consulted with the USFWS

under Section 7 of the Endangered Species Act (ESA) concerning potential impacts of BDM methods on T&E species and has obtained a Biological Opinion (B.O.). For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997, Appendix F). Oklahoma WS entered into an informal consultation with the USFWS to address additional T/E species in Oklahoma that were not included in the original 1992 B.O. and prepared a Biological Assessment (Appendix D) to assure that potential effects on T&E species have been adequately addressed.

In contrast to adverse impacts on nontarget animals from direct take by BDM methods, some nontarget species may actually benefit from BDM. Prime examples are the benefit to native cavity nesting bird species that results from any reduction in starling populations or the benefit to a number of bird species, including some T&E species, that results from reductions in populations of brown-headed cowbirds which parasitize nests of other birds.

2.2.3 Effects on Human Health and Safety

2.2.3.1 Safety of Chemical Control Methods

Some individuals have expressed concerns that chemical BDM methods should not be used because of potential adverse effects on people from being exposed to the chemicals directly or from the birds that have died as a result of the chemical use. Under the alternatives proposed in this EA, the primary toxicant proposed for use by WS is DRC-1339 (Starlicide), which would primarily be used to remove feral domestic pigeons, starlings, crows or blackbirds in damage situations. All WS avicide and chemical repellant use in Oklahoma, including the use of DRC-1339, is regulated by the EPA through FIFRA, the ODAFF as prescribed by Oklahoma State Laws, and by WS Directives. WS applicators are certified by the state, and must complete a written examination and undergo recurrent training. Other chemical methods that could be utilized are: Avitrol which is classified as an avian distressing agent and is normally used to avert certain bird species from using certain problem areas; the tranquilizer Alpha-chloralose, used for live-capturing nuisance waterfowl and pigeons, which is regulated by the Food and Drug Administration and WS policy; methyl anthranilate, an artificial grape flavoring used in the food industry which also has some bird repelling capabilities; and Polybutene products which are bird repellants that have a tactile, sticky consistency to touch and are applied directly to problem locations to prevent bird perching.

2.2.3.2 Impacts on Human Safety of Nonchemical BDM Methods

Some people may be concerned that WS's use of firearms and pyrotechnic bird scaring devices could cause injuries to people. WS personnel occasionally use small caliber firearms or air rifles and shotguns to remove feral domestic pigeons that are causing damage, and could use such firearms to remove other kinds of birds in damage situations. WS policy requires standard procedures for training, safe use, storage and transportation of firearms as prescribed by the WS Firearms Safety Training Manual (WS Directive 2.615, 05/03/02). The required firearms training is

conducted each year by certified instructors. Hands-on firearms proficiency is evaluated in the field and candidates must pass a written exam. Therefore, firearms are handled in a safe manner with consideration given to the proper firearm to be utilized, the target density, backstop and unique field conditions. Pyrotechnics often emit sparks when launched, creating some potential fire hazard to private property from field use. Before the implementation of formalized training standards, other states reported incidents where small fires were started from the use of pyrotechnics in the field. Pyrotechnics storage, transportation and use is regulated by the Alcohol, Tobacco and Firearms (ATF), Department of Transportation (DOT) and WS policy respectively. WS requires adherence to all Federal, State and local laws. Pyrotechnics on-hand are less than 50 lbs. in total weight; that, along with industry approved packaging of the materials allow Oklahoma WS's pyrotechnics to be classified as Division 1.4 (formally known as Class C), the lowest classification of explosive materials as defined by ATF. Pyrotechnics are stored and transported in approved metal boxes. Training for pyrotechnics field use is also conducted and maintained under the WS Firearms Safety Training Manual guidelines.

2.3.3.3 Effects on Human Health and Safety by Nuisance Birds for which BDM is Requested

The concern stated here is that the absence of adequate BDM would result in adverse effects on human health and safety, because the transmission of bird-borne diseases and bird strikes on aircraft would not be curtailed or reduced to the minimum levels possible and practical. Potential impacts of not conducting BDM could lead to increased incidence of bird-borne diseases in humans, or injuries or loss of human lives from bird strikes to aircraft.

2.2.4 Effects on Aesthetics

2.2.4.1 Effects on Human Affectionate-Bonds with Individual Birds and on Aesthetic Values of Wild Bird Species

Some individual members or groups of wild and feral domestic bird species habituate and learn to live in close proximity to humans. Some people in these situations feed such birds and/or otherwise develop emotional attitudes toward such animals that result in aesthetic enjoyment. In addition, some people consider individual wild birds as "pets," or exhibit affection toward these animals. Examples would be people who visit a city park to feed waterfowl or pigeons and homeowners who have bird feeders or bird houses. Many people do not develop emotional bonds with individual wild animals, but experience aesthetic enjoyment from observing them.

Public reaction to damage management actions is variable because individual members of the public can have widely different attitudes toward wildlife. Some individuals that are negatively affected by wildlife support removal or relocation of

damaging wildlife. Other individuals affected by the same wildlife may oppose removal or relocation. Individuals unaffected by wildlife damage may be supportive, neutral, or opposed to wildlife removal depending on their individual personal views and attitudes.

The public's ability to view wild mammals or birds in a particular area would be more limited if the wildlife are removed or relocated. However, immigration of wildlife from other areas could possibly replace the animals removed or relocated during a damage management action. In addition, the opportunity to view or feed other wildlife would be available if an individual makes the effort to visit other parks or areas with adequate habitat and local populations of the species of interest.

Some people do not believe that egret, geese, or nuisance blackbird or starling roosts should even be harassed to stop or reduce damage problems. Some of them are concerned that their ability to view migratory birds is lessened by WS nonlethal harassment efforts.

2.2.4.2 Effects on Aesthetic Values of Property Damaged by Birds

Property owners that have pigeons roosting or nesting on their buildings or waterfowl grazing on turf areas are generally concerned about the negative aesthetic appearance of bird droppings and the damage to turf. Business owners generally are particularly concerned because negative aesthetics can result in lost business. Costs associated with property damage include labor and disinfectants to clean and sanitize fecal droppings, implementation of nonlethal wildlife management methods, loss of property use, loss of aesthetic value of flowers, gardens, and lawns consumed by geese, loss of customers or visitors irritated by the odor of or of having to walk on fecal droppings, repair of golf greens, replacing grazed turf, and loss of time contacting local health departments and wildlife management agencies on health and safety issues.

2.2.5 Humaneness and Animal Welfare Concerns of Methods Used by WS

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if " . . . the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process."

Suffering is described as a " . . . highly unpleasant emotional response usually associated with pain and distress." However, suffering " . . . can occur without pain . . . ," and " . . . pain can occur without suffering . . . " (AVMA 1987). Because suffering carries with it the implication of a time frame, a case could be made for " . . . little or no suffering where death comes immediately . . . " (CDFG 1991), such as shooting.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would " . . . probably be causes for pain in other animals . . . " (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 1991).

Pain and suffering, as it relates to WS damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since " . . . neither medical or veterinary curricula explicitly address suffering or its relief" (CDFG 1991).

Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some BDM methods are used in situations where nonlethal damage management methods are not practical or effective.

OK WS personnel are experienced, trained and professional in their use of management methods, in order to be as humane as possible under the constraints of current technology, workforce and funding. Mitigation measures/Standard Operating Procedures (SOPs) used to maximize humaneness are listed in Chapter 3.

2.3 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

2.3.1 Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area.

Some individuals might question whether preparing an EA for an area as large as Oklahoma would meet the NEPA requirements for site specificity. Comparatively, BDM is a minor component of the Oklahoma WS program.

WS' mission is to manage damage caused by wildlife, not overall wildlife populations. As an agency that exists to manage specific types of damage, WS can predict the types of locations or situations where damage is likely to occur. However, due to any number of variable circumstances, WS has no absolute control over when a request for BDM assistance will be received nor can WS predict specific, individual times and locations of most bird damage situations. Therefore, WS must be ready and able to provide assistance on short notice. The missions of other Federal and state wildlife management agencies generally concentrate on management for wildlife abundance and are not equipped or prepared to prevent bird damage problems without resorting to extreme and extensive

population management strategies that, in most cases, would neither be prudent nor affordable. Given the numbers of birds, past experiences and program activity monitoring, WS believes this EA addresses most potential needs at any given location.

If a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire State may provide a better analysis than multiple EA's covering smaller zones.

2.3.2 Impacts of Hazing Programs on Livestock

Some individuals have raised concerns that noise from pyrotechnics used to harass birds could startle livestock and cause them to run through fences and be injured. Some dairy operators have voiced concerns that startling effects from noise harassment programs could adversely affect milk production. WS's personnel trained and experienced in using pyrotechnics have noted that in their experience, most animals habituate relatively easily to noises from the pyrotechnics. However, personnel avoid shooting pyrotechnics near identified livestock facilities where operators have expressed concerns.

2.3.3 WS's Impact on Biodiversity

The WS program does not attempt to eradicate any species of wildlife in Oklahoma. WS operates in accordance with international, federal and state laws, and regulations enacted to ensure species viability. Impacts on target and nontarget species populations because of WS's lethal BDM activities are minor as shown in section 4.1. The impacts of the current WS program on biodiversity are not significant nationwide or statewide (USDA 1997). In the case of local populations of nonnative species such as feral domestic pigeons, the goal may be to eliminate a local population but because such species are not part of the mix of native wildlife species, they are not an essential component of the native biodiversity. Rarely, if ever, would BDM result in the long term local elimination of any of these nonnative species. The suppression of some highly adaptable nonnative species populations could reduce competition within niches for sensitive species, increasing biodiversity.

2.3.4 Wildlife Damage is a Cost of Doing Business -- a "Threshold of Loss" Should be Established Before Allowing any Lethal Bird Damage Management

WS is aware that some people feel federal wildlife damage management should not be allowed until economic losses reach some arbitrary pre-determined threshold level. This type of policy, however, would be very difficult or inappropriate to apply to human health and safety situations. Although some damage can be tolerated by most resource owners, WS has the legal direction to respond to requests for wildlife damage management, and it is program policy to aid each requester with the goal of minimizing losses. WS uses the Decision Model thought process discussed in Chapter 3 to determine appropriate strategies.

In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie NF, et al., the United States District Court of Utah denied plaintiffs' motion for preliminary injunction. In part the court found that a forest supervisor need only show that damage from wildlife is threatened, to establish a need for wildlife damage management (Civil No. 92-C-0052A January 20, 1993). Thus, there is judicial precedence indicating that it is not necessary to establish a criterion such as percentage of loss of a herd to justify the need for wildlife damage management actions.

2.3.5 American Indian and Cultural Resource Concerns

The National Historic Preservation Act (NHPA) of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that can result in changes in the character or use of historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian tribes to determine whether they have concerns for traditional cultural properties in areas of these federal undertakings. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties. In addition, the predecision EA was made available to all tribes in the State to solicit their review and comment prior to issuing a decision. As was discussed in Section 1.7.2.5, WS BDM actions are not undertakings as defined by the NHPA. Harassment techniques that involve noise-making could have a primary effect that would be beneficial. The use of such devices are usually short term and could be discontinued if any conflicts arose with the use of historic properties.

2.3.6 Lethal BDM for Blackbirds and Starlings is Futile Because of a 50-60% Annual Mortality Rate

Because natural mortality in blackbirds populations is 50 - 65% per year (see section 4.1.1.1), some persons argue that this shows lethal BDM actions are futile. However, the rate of natural mortality has little or no relationship to the effectiveness of lethal BDM because natural mortality generally occurs randomly throughout a population and throughout the course of a year. Natural mortality is too gradual in individual concentrations of depredating birds to adequately reduce the damage that such concentrations are causing. It is probable that mortality caused by BDM actions is not additive to natural mortality but merely displaces it. In any event, it is apparent that the rate of mortality from BDM is well below the extent of any natural fluctuations in overall annual mortality and is, therefore, insignificant to regional populations. The objective of lethal BDM in Oklahoma is not to necessarily add to overall blackbird or starling mortality, which would be futile under current funding limitations, but to redirect mortality to a segment of the population that is causing damage in order to realize benefits during the current production season. The resiliency of these bird populations does not mean individual BDM actions are not successful in reducing damage, but that periodic and recurring BDM actions are necessary in many situations.

2.3.7 Cost-effectiveness of BDM

"Does the value of damage avoided equal or exceed the cost of providing BDM?" The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.23) do not require a formal, monetized cost-benefit analysis to comply with NEPA. Consideration of this issue is not essential to making a reasoned choice among the alternatives being considered. The ADC EIS, Appendix L, p. 32 (USDA 1997) stated:

> "Cost effectiveness is not, nor should it be, the primary goal of the APHIS ADC program. Additional constraints, such as environmental protection, land management goals, and others, are considered whenever a request for assistance is received. These constraints increase the cost of the program while not necessarily increasing its effectiveness, yet they are a vital part of the APHIS ADC program."

3.0 CHAPTER 3: ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 Alternatives Analyzed in Detail are:

1) Alternative 1 - Continue the Current Federal BDM Program. This is the Proposed Action as described in Chapter 1 and is the "No Action" alternative as defined by the Council on Environmental Quality for analysis of ongoing programs or activities.

2) Alternative 2 - Nonlethal BDM Only By WS

3) Alternative 3 - Technical Assistance Only. Under this alternative, WS would not conduct any direct operational BDM activities in Oklahoma. If requested, affected resource owners would be provided with technical assistance information only.

4) Alternative 4 - No Federal WS BDM. This alternative consists of no federal BDM program by WS.

3.2 DESCRIPTION OF THE ALTERNATIVES

3.2.1 Alternative 1 - Continue the Current Federal BDM Program (No Action/Proposed Action)

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with the Council on Environmental Quality's (CEQ's) definition (CEQ 1981).

The proposed action is to continue the current portion of the WS program in Oklahoma that responds to requests for BDM to protect human health and safety, agricultural resources, crops, turf, landscaping, livestock feed, livestock, livestock health, property, natural resources, threatened and endangered species, other wildlife, forestry and aquaculture in the State of Oklahoma. A major component of the current program is the protection of human health and safety and property from wildlife strikes to aircraft. Another important portion of the current program is implementing an integrated strategy to minimize damage or the risk of damage to pecans and peanuts from wintering and resident crows in the State. The program would also operate to reduce or minimize the loss of livestock feed and the risk of bird-related livestock health problems presented by starlings and blackbirds at requesting dairies and feedlots, and to meet requests to minimize bird damage or the risk of damage to all other resources. To meet these goals WS would have the objective of responding to all requests for assistance with, at a minimum, technical assistance or self-help advice, or, where appropriate and when cooperative or congressional funding is available, direct damage management assistance in which professional WS Specialists and/or Biologists conduct damage management actions. An Integrated Wildlife Damage Management (IWDM) approach would be

implemented which would allow use of any legal technique or method, used singly or in combination, to meet requestor needs for resolving conflicts with birds. Agricultural producers and others requesting assistance would be provided with information regarding the use of effective nonlethal and lethal techniques. Lethal methods used by WS would include shooting, trapping, egg addling/destruction, DRC- 1339 (Starlicide), Avitrol, or euthanasia following live capture by trapping, hand capture, nets, or use of the tranquilizer alpha-chloralose (A-C). Nonlethal methods used by WS may include porcupine wire deterrents, wire barriers and deterrents, the tranquilizer A-C, chemical repellents (e.g., methyl anthranilate, polybutene tactile repellents, etc.), and harassment. In many situations, the implementation of nonlethal methods such as exclusion-type barriers would be the responsibility of the requestor to implement which means that, in those situations, WS only function would be to implement lethal methods if determined to be necessary. BDM by WS would be allowed in the State, when requested, on private property sites, public facilities or other locations where a need has been documented, upon completion of an Agreement for Control. All management actions would comply with appropriate Federal, state, and local laws. Appendix E provides a more detailed description of the methods that could be used under the proposed action.

3.2.2 Alternative 2 - Nonlethal BDM Only By WS

This alternative would require WS to use nonlethal methods only to resolve bird damage problems. Persons receiving technical assistance could still resort to lethal methods that were available to them. Currently, DRC-1339 and alpha-chloralose are only available for use by WS employees. Therefore, use of these chemicals by private individuals would be illegal. Appendix E describes a number of nonlethal methods available for use by WS under this alternative.

3.2.3 Alternative 3 - Technical Assistance Only

This alternative would not allow for WS operational BDM in Oklahoma. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, or others could conduct BDM using traps, shooting, Avitrol, or any nonlethal method that is legal. Avitrol could only be used by State certified pesticide applicators. Currently, DRC-1339 and alpha-chloralose are only available for use by WS employees. Therefore, use of these chemicals by private individuals would be illegal. Appendix E describes a number of methods that could be employed by private individuals or other agencies after receiving technical assistance advice under this alternative.

3.2.4 Alternative 4 - No Federal WS BDM

This alternative would eliminate Federal involvement in BDM in Oklahoma. WS would not provide direct operational or technical assistance and requesters of WS services would have to conduct their own BDM without WS input. DRC-1339 and alpha-chloralose are only available for use by WS employees. Therefore, use of these chemicals by private

individuals would be illegal. Avitrol could be used by any State certified restricted-use pesticide applicator.

3.3 BDM Strategies Available to WS in Oklahoma

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2 and 3 described above. Alternative 4 would terminate both WS technical assistance and operational BDM by WS. Appendix E is a more thorough description of the methods that could be used or recommended by WS.

3.3.1 Integrated Wildlife Damage Management (IWDM) (Current Program)

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially to achieve a cumulative effect. The philosophy behind IWDM is to implement the best combination of effective management methods in a cost-effective manner while minimizing the potentially harmful effects on humans, target and nontarget species, and the environment. IWDM may incorporate cultural practices (i.e., animal husbandry), habitat modification (i.e., exclusion), animal behavior modification (i.e., scaring), removal of individual offending animals, local population reduction, or any combination of these, depending on the circumstances of the specific damage problem.

3.3.1.1 The IWDM Strategies That WS Employs

Technical Assistance Recommendations.
"Technical assistance" as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods. The implementation of damage management actions is the responsibility of the requester. In some cases, WS provides supplies or materials that are of limited availability for non-WS entities to use. Technical assistance may be provided following a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and the practicality of their application.

Under APHIS NEPA Implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving bird damage problems.

Direct Damage Management Assistance
This is the conduct or supervision of damage management activities by WS personnel. Direct damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone, and when Agreements for Control or other comparable instruments provide for WS direct damage management. The initial investigation defines the nature, history,

extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. Professional skills of WS personnel are often required to effectively resolve problems, especially if restricted use pesticides are necessary, or if the problem is complex. WS direct BDM assistance involves the implementation of lethal control or nonlethal capture or harassment methods.

3.3.1.2 Examples of WS Direct Operational and Technical Assistance in BDM in Oklahoma

Crow Damage to Crops. Many pecan and peanut producers lose a portion of their crop each year to migratory and resident crows. From the time the pecans first begin to develop in late summer until they are harvested in the fall or winter, pecan nuts are vulnerable to shell cracking, feeding, or caching by crows. Peanuts are another crop that is susceptible to damage once the nuts are dug up and exposed above the ground for harvest. WS responds directly to a number of calls each year where crows are damaging these crops. WS generally utilizes technical assistance initially, recommending noise harassment strategies (propane exploders or cannons, harassment shooting, etc.). Other recommendations could include visual deterrents (mylar flags, balloons, scarecrows, etc.) Where these methods become ineffective, WS may use the avicide DRC-1339, which according to EPA registration is exclusive for WS use. Shooting, at fields and at roosts can be used to take birds that have become accustomed to feeding in particular fields. Crows can be captured and euthanized using traps of various designs and nets. These lethal methods can be further integrated into a program where nonlethal strategies are simultaneously implemented.

Feral Domestic Pigeon Problems Feral domestic pigeons are responsible for the majority of nuisance bird damage requests for assistance in OK. The most common situation with this species involves pigeons roosting and nesting on buildings and structures. The main nuisance problem is from the birds' droppings which are most frequently addressed by recommending exclusion devices/barriers (such as netting, hardware cloth, screen, porcupine wire) or habitat modification and local population reduction. Methods that could be used for population reduction include shooting with pellet rifles, low-velocity .22 caliber rifle rounds, shotguns (mostly in rural or semi-rural situations), live capture with cage traps followed by euthanasia, DRC-1339 baiting, or Avitrol. WS has been requested in recent years to reduce local pigeon numbers in several cities and facilities around the state.

WS expects to receive future requests from all across the state and could respond with technical assistance, direct operational control, or a combination of both in any situation statewide.

Heron/Egret Rookeries Herons and egrets usually congregate into colonies of nesting adults called "rookeries" in the spring breeding season. These rookeries are generally established in wooded areas or vacant lots near urban areas. Occasionally they are established adjacent to homes and businesses and cause problems due to

nuisance odors from droppings, regurgitated prey items such as fish, crustaceans, frogs, etc., natural bird mortality, and eggs. The congregated birds over-fertilize the soil with droppings that kill trees and shrubs within the rookery. Young birds that fall from their nests often find refuge under porches, in garages or under cars. Egrets often fly low to the ground and at slow speeds, feeding in open areas. This often makes them vulnerable to collide with aircraft. These birds, as well as their nests and eggs, are protected by the Migratory Bird Treaty Act. Egrets and herons will generally return to the same rookery year after year until the dead vegetation can no longer support their nesting. After the egrets migrate southward in the fall, it is recommended to radically modify the available habitat at the site by removing most of the trees and underbrush. Pyrotechnics can be utilized to scare egrets from the location before nesting begins. Pending a permit secured from the USFWS approving these practices, and the approval from state and local governments, egrets and herons could be taken by shooting with shotguns and the nests could be destroyed.

Due to the tenacity of these birds to stay at the rookery area during nesting and the legal status of egrets and herons, WS expects to continue to receive requests, particularly from urban areas. The primary mode of response would likely be with technical assistance. Any direct operational control, or a combination of both, would be contingent on the level of damage experienced and program funding.

3.3.1.3 WS Decision Making

WS personnel are frequently contacted after requesters have tried or considered both nonlethal and lethal methods and found them to be ineffective for any number of reasons. Misapplied or inappropriate methods are often impractical, too costly, time consuming or inadequate for reducing damage to an acceptable level. WS personnel assess the problem, evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation are developed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. This conscience thought process for evaluating and responding to damage complaints is the WS Decision Model (Slate et al. 1992) (Appendix F). In the model, most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a documented process, but a mental problem-solving process common to most if not all professions.

3.3.1.4 Bird Damage Management Methods Available for Use. (See Appendix E for detailed descriptions of BDM Methodologies)

Nonchemical, Nonlethal Methods

These are practices that consist primarily of nonlethal preventive methods such as cultural methods and habitat modification that could be implemented by an agricultural producer or property owner.

Animal behavior modification refers to tactics that alter the behavior of birds to reduce damages. Some but not all of these tactics include:

- Exclusions such as netting (to exclude birds)
- Propane exploders (to scare birds)
- Pyrotechnics (to scare birds)
- Distress calls and sound producing devices (to scare birds)
- Visual repellents and scaring tactics

Nest destruction of the target species before eggs or young are in the nest.

Habitat/environmental modification to attract or repel certain bird species.

Live traps are various types of traps designed to capture birds alive for relocation. Some examples are: clover traps, decoy traps, nest box traps, mist nets, drive traps, cannon or rocket nets, pole traps, etc.

Lure crops/alternate foods are crops planted or other food resources provided to mitigate the potential loss of higher value crops.

Chemical, Nonlethal Methods

Avitrol is a chemical frightening agent registered for use on pigeons, crows, gulls, blackbirds, starlings, and English sparrows in various situations. This chemical works by causing distress behavior in the birds that consume treated kernels from a mixture of treated and untreated bait, which generally frightens the other birds from the site. Generally, birds that eat the treated bait will die (Johnson and Glahn 1994).

Alpha-chloralose is used as an immobilizing agent, which is a central nervous system depressant, and used to capture waterfowl or other birds. It is generally used in recreational and residential areas, such as swimming pools, shoreline residential areas, golf courses, or resorts. Alpha-chloralose is typically delivered as a well contained bait in small quantities with minimal hazards to pets and humans; single bread or corn baits are fed directly to the target birds.

Methyl Anthranilate (MA) (artificial grape flavoring food additive) has been shown to be an effective repellent for many bird species, including waterfowl. It can be applied to turf or surface water or as a fog to repel birds from small areas. It may also become available for use as a livestock feed additive that has bird repellent value.

Tactile repellents or Polybutene repellents are sticky compounds which, when applied to ledges or sills may discourage birds from roosting or returning to the treated areas. The material will remain sticky at temperatures below freezing, but may be affected by blowing or accumulating dust or debris that could reduce effectiveness.

Mesurol or methiocarb is an insecticide/molluscicide used to control slugs and snails in a wide range of agricultural situations. Methiocarb has been demonstrated to have bird repellent qualities. APHIS recently registered methiocarb as a deterrent for ravens and crows that destroy eggs of federally-designated threatened or endangered species. Methiocarb in treated eggs acts as an aversion agent to condition ravens or crows to not predate eggs in nests. Ideally, birds feeding on treated eggs associate their negative feeding experience with the nest and viable eggs, preventing further damage. It is also registered in several states for bird repellency on blueberries and cherries. In several countries, Mesurol/methiocarb is used as a bird repellent on corn. Other research indicates repellency potential on grapes, rice, & sorghum (Spectrum 2002, USDA 2002).

Other repellents: Other bird repellents that might become available include anthraquinone and charcoal particles (e.g., adhered to livestock feed).

Nicarbazin is a chemical that is approved by the FDA to control the disease coccidosis in broiler chickens. When fed to chickens in high concentrations, some of the side effects were a decrease in egg production, and the fertilized eggs that were laid did not hatch. There were no negative effects to the health of the adult chickens. Researchers at the National Wildlife Research Center (NWRC) are now working to establish doses and delivery systems to use this reproductive inhibitive technology to deal with ever increasing Canada goose populations (USDA 2002).

Nonchemical, Lethal Methods

Egg addling/destruction is the practice of destroying the embryo in the egg prior to hatching; physically breaking eggs; or directly removing eggs from a nest and destroying them.

Various types of traps are designed to capture birds alive initially, but captured birds may be euthanized rather than released. Some examples are: clover traps, decoy traps, nest box traps, mist nets, drive traps, cannon or rocket nets, pole traps, etc. Decoy and nest box traps are sometimes used by WS to capture blackbirds, starlings and pigeons. Decoy traps are set in limited numbers in selected locations where a

resident population is causing localized damage or where other techniques cannot be used. Blackbird/starling decoy traps are similar in design to the Australian Crow Trap as reported by Johnson and Glahn (1994) and McCracken (1972). Pigeon traps are simple cages with a door system that allows entry by multiple birds. Live decoy birds are placed in the trap with sufficient food and water to assure their survival. Feeding behavior and calls of the decoys attract other birds into the trap. Target birds taken in these traps are euthanized. Snap traps are modified rat traps that are used to remove individual birds such as woodpeckers causing damage to buildings.

Shooting is the practice of selectively removing target birds by shooting with an air rifle, shotgun, or rifle. Shooting a few individuals from a larger flock can reinforce birds' fear of harassment techniques. Sport hunting can be part of a BDM strategy to enhance the effectiveness of harassment techniques. For example, WS may recommend that resource owners solicit sport hunters licensed by the ODWC to hunt in wheat fields where geese cause damage. With flocking species, the number that can be killed by shooting is generally very small in relation to the number involved in damage situations. Usually only a few dozen birds can be shot from individual flocks that can number anywhere from a few hundred to many thousands or hundreds of thousands. The birds are killed as quickly and humanely as possible. At times, shooting with rifles or shotguns may be used as a dispersal technique alone; these may be used to manage bird damage problems when lethal methods are determined to be appropriate. It is selective for target species and may be used in conjunction with the use of spotlights, decoys, and calling.

Chemical, Lethal Methods

DRC-1339 is a slow acting avicide for reducing damage from several species of birds, including blackbirds, starlings, pigeons, crows, ravens, magpies, and gulls. DRC-1339 is highly toxic to sensitive species but only slightly toxic to nonsensitive birds, predatory birds and mammals. This chemical would be the primary lethal chemical method used for feral domestic pigeon, starling, blackbird, and crow damage management under the current program.

Carbon dioxide (CO_2) gas is an American Veterinary Medical Association (AVMA) approved euthanasia method which is sometimes used to euthanize birds which are captured in live traps or by chemical immobilization and when relocation is not a feasible option. Live birds are placed in a container or chamber into which CO_2 gas is released. The birds quickly expire after inhaling the gas.

Egg oiling is a technique where corn oil is applied to eggs during the nesting season to prevent hatching. The oil prevents gas exchange through the shell and prevents chick development. Because nests are not destroyed and eggs are not removed, nesting birds are encouraged to continue incubation behavior, often well beyond the normal time for hatching, discouraging re-nesting attempts. Corn oil as an egg oiling agent is exempt from EPA registration requirements.

3.3.2 ALTERNATIVE 2 - Only Nonlethal BDM By WS

This alternative would require that WS only utilize nonlethal methods in addressing bird damage problems. For other types of BDM problems, producers, state agency personnel, or others could conduct BDM activities including the use of trapping, shooting, and any lethal or nonlethal methods they wish. The basis of method selection may not be biologically sound or prudent. The chemicals DRC- 1339 and alpha-chloralose are currently only available for use by WS employees. Therefore use of these chemicals by private individuals would be illegal, and private and commercial applicators would be left only with using an extremely narrow choice of legal or effective alternatives if chemical control was needed (i.e. Avitrol, etc.). The full benefit of many nonlethal methods would not be fully realized; WS would not be able to fully resolve situations where birds had become accustomed or acclimated to nonlethal strategies.

3.3.3 ALTERNATIVE 3 - Technical Assistance Only

This alternative would not allow WS operational BDM in the State. WS would only provide technical assistance and make recommendations when requested. Producers, state agency personnel, or others could conduct BDM activities including the use of traps, shooting, and any lethal or nonlethal methods they wish. The chemicals DRC- 1339 and alpha-chloralose are currently only available for use by WS employees. Therefore use of these chemicals by private individuals would be illegal, and private and commercial applicators would be left only with using an extremely narrow choice of legal or effective alternatives if chemical control was needed (i.e. Avitrol, etc.).

3.3.4 ALTERNATIVE 4 - No Federal WS Bird Damage Management

This alternative would consist of no federal involvement in BDM in the State -- neither direct operational management assistance nor technical assistance to provide information on nonlethal and/or lethal management techniques would be available from WS. Information on future developments in nonlethal and lethal management techniques that culminate from research efforts by WS's research branch would not be as accessible to affected resource owners or managers, as the OK WS program would not be a direct source of such information. Producers, state agency personnel, or others would be left with the option to conduct BDM activities including the use of trapping, shooting, and any lethal or nonlethal methods. The basis of method selection may not be biologically sound or prudent. The chemicals DRC- 1339 and alpha-chloralose are currently only available for use by WS employees. Therefore use of these chemicals by private individuals would be illegal, and private and commercial applicators would be left only with using an extremely narrow choice of legal or effective alternatives if chemical control was needed (i.e. Avitrol, etc.).

3.4 Alternatives Considered But Not Analyzed in Detail With Rationale

Several alternatives were considered but not analyzed in detail. These were:

3.4.1 Lethal BDM Only By WS

Under this alternative, WS would not conduct any nonlethal control of birds for BDM purposes in the State, but would only conduct lethal BDM. This alternative was eliminated from further analysis because many situations can be resolved effectively through nonlethal means. For example, for blackbird roosts in urban areas, WS has used nonlethal methods exclusively as an effective means to resolving damage. Lethal BDM Only does not interface with the overall concept of IWDM, where multiple methods can achieve a desired cumulative effect. Restricting that portion of the program to lethal methods only would likely not be socially acceptable to various agencies, groups and individuals.

3.4.2 Compensation for Bird Damage Losses

The Compensation alternative would require the establishment of a system to reimburse persons impacted by bird damage. This alternative was eliminated from further analysis because no federal or state laws currently exist to authorize such action. Under such an alternative, WS would not provide any direct control or technical assistance. Aside from lack of legal authority, analysis of this alternative in the FEIS indicated that the concept has many drawbacks (USDA 1997):

- It would require larger expenditures of money and labor to investigate and validate all damage claims, and to determine and administer appropriate compensation. A compensation program would likely cost several times as much as the current program.
- Compensation would most likely be below full market value. It is difficult to make timely responses to all requests to assess and confirm damage, and certain types of damage could not be conclusively verified. For example, it would be impossible to prove conclusively in individual situations that birds were responsible for disease outbreaks even though they may actually have been responsible. Thus, a compensation program that requires verification would not meet its objective for mitigating such losses.
- Compensation would give little incentive to resource owners to limit damage through improved cultural, husbandry, or other practices and management strategies.
- Not all resource owners would rely completely on a compensation program and unregulated lethal control would most likely continue as permitted by state law.
- Compensation would not be practical for reducing threats to human health and safety.

- Compensation would do nothing to alleviate or prevent damage to natural resources, particularly T/E species.

3.4.3 Short Term Eradication and Long Term Population Suppression

An eradication alternative would direct all WS program efforts toward total long term elimination of bird populations on private, state, local government, and tribal lands within entire cooperating counties or larger defined areas in the State.

In Oklahoma, eradication of native bird species is not a desired population management goal of state agencies. Although generally difficult to achieve, elimination of a local population of feral domestic pigeons or starlings may be the goal of individual BDM projects. This is because feral domestic pigeons and starlings are not native to North America and are only present because of human introduction. However, eradication as a general strategy for managing bird damage will not be considered in detail because:

- WS opposes eradication of any native wildlife species.
- ODWC and ODAFF oppose eradication of any native Oklahoma wildlife species.
- Eradication is not acceptable to most members of the public.
- Because blackbirds and starlings are migratory and most winter populations are comprised of winter migrants from northern latitudes, eradication would have to be targeted at the entire North American populations of these species to be successful. That would not be feasible or desirable.

Suppression would direct WS program efforts toward managed reduction of certain problem populations or groups. In areas where damage can be attributed to localized populations of birds, WS can decide to implement local population suppression as a result of using the WS Decision Model. Problems with the concept of suppression are similar to those described above for eradication.

It is not realistic or practical to consider large-scale population suppression as the basis of the WS program. Typically, WS activities in the State would be conducted on a very small portion of the sites or areas inhabited or frequented by problem species.

3.4.4 Use of Bird-Proof Feeders in Lieu of Lethal Control at Dairies and Cattle Feeding Facilities

A number of feeder designs have been proposed that would limit the access of livestock feed to free-ranging birds. Similar type systems could be recommended by WS under the current program should any become available that are effective, practical, and economically feasible for producers to implement. Birds at livestock facilities feed extensively on spilled feed during the feeding process, feed scattered by cattle and undigested feed in cattle waste; therefore, bird-proof feeders would be a partial solution in

an IWDM strategy. Because of these factors, this alternative was not considered any further.

3.5 Mitigation and Standard Operating Procedures for Bird Damage Management Techniques

3.5.1 Mitigation in Standard Operating Procedures (SOPs)

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current WS program, nationwide and in Oklahoma, uses many such mitigation measures and these are discussed in detail in Chapter 5 of the FEIS (USDA 1997). Some key mitigating measures pertinent to the proposed action and alternatives that are incorporated into WS's SOPs include:

- The WS Decision Model thought process which is used to identify effective wildlife damage management strategies and their impacts.
- Reasonable and prudent measures or alternatives are identified through consultation with the USFWS and are implemented to avoid impacts to T&E species.
- EPA-approved label directions are followed for all pesticide use. The registration process for chemical pesticides is intended to assure minimal adverse impacts to the environment when chemicals are used in accordance with label directions.
- All WS Specialists in the State who utilize restricted-use chemicals are trained and certified by ODAFF in pesticide use and are recognized as experts in the safe and effective use of chemical BDM materials.
- The presence of nontarget species is monitored before using DRC-1339 to control starlings, blackbirds, feral pigeons and crows to reduce the risk of mortality of nontarget species populations.
- Research is being conducted to improve BDM methods and strategies so as to increase selectivity for target species, to develop effective nonlethal control methods, and to evaluate nontarget hazards and environmental impacts.

Some additional mitigating factors specific to the current program include:

- Management actions would be directed toward localized populations or groups of target species and/or individual offending members of those species. Generalized population suppression across the State, or even across major portions of the state, would not be conducted.
- WS uses BDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1997, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazard to the public is even further reduced.

3.5.2 Additional Mitigation specific to the issues

The following is a summary of additional mitigation measures that are specific to the issues listed in Chapter 2 of this document.

3.5.2.1 Effects on Target Species Populations

BDM activities are directed to resolving bird damage problems by taking action against individual problem birds, or local populations or groups, not by attempting to eradicate populations in the entire area or region.
WS take is monitored by comparing numbers of birds killed by species or species group (e.g., blackbirds, crows) with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of native species populations (See Chapter 4).

3.5.2.2 Effects on Nontarget Species Populations Including T&E Species

WS personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding nontargets. Observations of birds feeding at feedlots or dairies, pecan orchards, peanut fields, or in urban areas are made to determine if nontarget or T & E species would be at significant risk from BDM activities. Further strategies to avoid the take of nontarget birds would also include the consideration of the baits or attractants used and the location of the management action.

WS has made a "no effect" determination, or has consulted with the USFWS regarding potential impacts of control methods on T&E species, and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that finding or consultation. For the full context of the Biological Opinion see the ADC FEIS, Appendix F (USDA 1997). WS will abide by any RPAs and RPMs, to avoid jeopardizing any listed species.

WS may be called upon to provide BDM to benefit T/E species, candidate species or species of concern. Several examples of this type of action include the control of nest parasitism by cowbirds to protect the endangered black-capped vireo. Raptors and other birds that prey upon or threaten Interior least terns or piping plover adults, chicks, eggs or nests could be captured, relocated or euthanized

Avian predators of lesser prairie chickens (a candidate species) could be captured, moved or euthanized to enhance recruitment. These actions would provide a positive benefit to T/E species with no significant negative impacts to target or nontarget populations.

WS uses chemical methods for BDM that are approved and labeled for use by the EPA or FDA and the ODAFF. These chemicals have undergone rigorous research to prove their lack of serious effects on the environment, human safety and nontarget animals.

4.0 CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. The chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of each alternative in comparison with the proposed action to determine if the real or potential impacts would be greater, lesser, or the same. Therefore, the proposed action or current program alternative serves as the baseline for the analysis and the comparison of expected impacts among the alternatives. The background and baseline information presented in the analysis of the current program alternative thus also applies to the analysis of each of the other alternatives.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, floodplains, wetlands, visual resources, air quality, aquatic resources and range. These resources will not be analyzed further.

Cumulative Impacts: Discussed in relationship to each of the potentially affected species analyzed in this chapter.

Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Impacts on sites or resources protected under the National Historic Preservation Act: WS BDM actions are not undertakings that could adversely affect historic resources (See Section 1.7.2.5).

4.1 Environmental Consequences for Issues Analyzed in Detail

4.1.1 Effects on Target Species Populations

4.1.1.1 Alternative 1 - Continue the Current Federal Bird Damage Management Program (The Proposed Action as described in Chapter 1)

WS utilizes both nonlethal and lethal methods as needed for appropriate biologically sound, effective BDM. Analysis of this issue is limited primarily to those species most often killed during WS BDM; however, nonlethal BDM will be analyzed for potential impacts as well. The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997). Magnitude is described in USDA (1997) as " . . . a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage.

Starling and Blackbird Population Impacts

Colonization of North America by the European starling began on March 6, 1890 when 80 starlings were released into New York's Central Park by a Mr. Eugene Scheifflin, a member of the Acclimatization Society. The birds thrived and exploited their new habitat. By 1918, the advance line of migrant juveniles extended from Ohio to Alabama; by 1926 from Illinois to Texas; by 1941 from Idaho to Oklahoma; and by 1946 to California and Canadian coasts (Miller 1975). In just 50 short years the starling had colonized the United States and expanded into Canada and Mexico and 80 years after the initial introduction had become one of the most common birds in North America (Feare 1984).

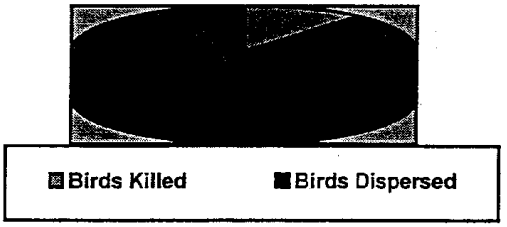
An extensive population survey by Dolbeer and Stehn published in 1979 showed that, in the southwestern U.S., the number of breeding starlings doubled between 1968 and 1976. In California, where starlings were first observed in 1942, the number of breeding birds increased by 19% during the same period. Breeding Bird Survey (BBS) data from Sauer et al. (2001) indicate a slight increase (0.8% per year) in the starling breeding population in the western U.S. from 1966 -1979, and a slight decrease (2.7% per year) from 1980 - 1994. Breeding Bird Survey data for Oklahoma indicates starling populations as stable from 1987 to 2000, which may indicate saturated available habitats. Red-winged blackbirds showed a stable to slight increase trend in populations in Oklahoma over the last thirty years. Yellow-headed blackbirds showed a sharp increase from 1987 to 2000. Brown-headed cowbirds in Oklahoma show slightly decreasing trend in populations (Sauer et al. 2001).

The nationwide starling population has been estimated at 140 million (Johnson and Glahn 1994). The winter starling population in the northwest and southwest regions has been estimated at 27.8 million (Meanley and Royall 1976). The northwest and southwest regional population of the blackbird group is 139 million of which 27.8 million are starlings (Meanley and Royall 1976).

Precise counts of blackbird and starling populations do not exist but one estimate placed the United States summer population of the blackbird group at over 1 billion (USDA 1997) and the winter population at 500 million (Royall 1977). The majority of these birds occur in the eastern U.S.; for example surveys in the southeastern part of the country estimated 350 million blackbirds and starlings in winter roosts (Bookhout and White 1981). Meanley and Royall (1976) estimated 538 million blackbirds and starlings in winter roosts across the country during the winter of 1974-75. Of this total 26% or 139 million were in the west.

All of the above information indicates that populations of starlings and blackbirds have been relatively stable in recent years. For most species that show upward or downward trends, such trends have been relatively gradual. Additionally, native blackbird populations are healthy enough, and the problems they cause great enough, that the USFWS has established a standing depredation order for use by the

Figure 4-1



From FY 98 to FY 01, the numbers of blackbirds and starlings dispersed to protect crops, property and human health and safety in Oklahoma was almost eight times the number of birds that were actually killed by WS (figure 4-1). Surveys indicating stable to increasing trends for starlings and blackbirds respectively support that neither of these actions affected the overall populations of in Oklahoma (Sauer et al. 2001)

Feral Domestic Pigeon Population Impacts

The feral domestic pigeon, also known as the rock dove, is an introduced nonnative species in North America. Breeding Bird Survey data indicate the species has been steadily increasing in Oklahoma from 1967 through 2000 (Sauer et al. 2001). The species is not protected by federal or state law. Any BDM involving lethal control actions by WS for this species would be restricted to isolated individual sites or communities. In those cases where feral domestic pigeons are causing damage or are a nuisance, complete removal of the local population could be achieved. This would be considered to be a beneficial impact on the human environment since it would be requested by the affected property owner or administrator. Although regional population impacts would be minor, even if significant regional or nationwide reductions could be achieved, this would not be considered an adverse impact on the human environment because the species is not part of native ecosystems. However, major population reduction in some localities may be considered a negative impact by some individuals who experience aesthetic enjoyment of pigeons.

Between FY 98 and FY 01, OK WS took an average of 1,173 pigeons per year statewide, primarily to reduce sanitation and health problems associated with accumulations of droppings on rooftops and store fronts (OK MIS). This relatively small number of pigeons taken at these multiple sites had no effect on overall pigeon populations in Oklahoma. (Sauer et al. 2001)

American Crows

American crows exist in Oklahoma year-round; however, winter migrations raise the local populations each year as historical winter roosts are re-occupied or new roost sites are established. Several major roosts exist throughout Oklahoma. Numbers are variable from roost to roost, and from year to year. Estimates on

public. Under this "order" (50 CFR 21.43), no Federal permit is required by anyone to remove blackbirds if they are committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance.

Natural mortality in blackbird populations is between 50% and 65% of the population each year, regardless of human-caused control operations (USDA 1997). The northwest and southwest regional population of the blackbird group has been estimated to be about 140 million of which about 28 million are starlings (Meanley and Royall 1976). Estimated natural mortality of the blackbird group should therefore be between 60 and 75 million birds annually WS's largest kill of blackbirds and starlings in Oklahoma (32,781 during FY 01) was .05 % of the estimated natural mortality of these populations, and would be expected to be no more than 2% of total mortality in any one year under the current program. Regionally, WS's confirmed kill from FY99-FY01, which may be underestimated, averages approximately 2.4 million blackbirds and starlings annually (USDA 2002), which accounts for 4% of the natural mortality in the population. Even if WS's actual regional kill is much higher than the "confirmed" kill, it should continue to be well below normal mortality levels for these populations.

Dolbeer et al. (1995) showed that WS kills of 3.6% of the wintering population had no effect on breeding populations the following spring. Dolbeer et.al. (1976) constructed a population model which indicated that a reduction of 14.8% of the wintering blackbird population would reduce the spring breeding population by 20% and that a 56.2% reduction in the wintering blackbird population would reduce spring breeding populations by only 33%. Given the density-dependent relationships in a blackbird population (i.e. decreased mortality and increased fecundity of surviving birds) a much higher number would likely have to be killed in order to impact the regional breeding population.

Cumulative impacts would be mortality caused by the OK WS program added to the other known human causes of mortality. The maximum annual mortality caused by the OK WS program would not be anticipated to exceed 2% of the population in any future year; therefore, the proposed control actions implemented under this alternative would have no significant impact on overall breeding populations.

Starlings, being non-indigenous and because of their negative impacts and competition with native birds, are considered by many wildlife biologists and ornithologists to be an undesirable component of North American wild and native ecosystems. Any reduction in starling populations in North America, even to the extent of complete eradication, could be considered a beneficial impact to native bird species.

historical roosts showed millions of crows concentrated in communal roosts (Johnson 1994).

The arrival of wintering crows in Oklahoma coincides with the harvest times of several important agricultural commodities (e.g. pecans and peanuts). Efforts to control depredation to these commodities include a variety of both non-lethal and lethal methods. Lethal methods employed include shooting, as well as the chemical toxicant DRC-1339. Lethal strategies are intended to reduce the population of crows feeding on these valuable commodities that have not successfully been deterred by non-lethal measures.

From 1934 to 1945, in an organized effort by the Oklahoma Game and Fish Commission, 127 crow roosts were dynamited in Oklahoma during winter to reduce waterfowl egg predation and damage to grain crops. Over 3.8 million crows were killed, but no evidence was obtained indicating an influence on total population levels during the period (Dolbeer 1986). However, in addition to this campaign, the hunting seasons for the recreational take of crows continued to occur, just as it continues today. Despite the attitudes of the day that encouraged the complete extirpation of the American crow, the birds continued to thrive.

The damage threat from crows, along with their abundance, is significant enough that a Depredation Order issued by the USFWS exists to allow the take of crows "when found committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance" with no Federal permit (50 CFR 21.43). Also, the approved Oklahoma sport hunting season for crows is liberal (open from Oct. 10-Nov.16, 2002, and Dec. 9, 2002 - March 4, 2003 statewide) with no bag limit. During the 2001 Oklahoma crow hunting season, an estimated 534,702 crows were harvested by sportsmen, and that actual harvest number could be as high as 1,000,000 birds (ODWC 2002). During the first three years of crow damage management utilizing DRC 1339 in Oklahoma, 1,582 grams of the avicide was used to treat a total of 344 lbs. of whole kernel corn. This would account for a combined three year total of 610,944 lethal kernels of corn based on DRC-1339 studies on lethal rates for crows (Timm 1994). Considering the acute oral LD 50 for crows, the combined three year total would be 305,472, or an annual average of 101,824 crows removed from depredated pecan orchards. However, several factors exist that can significantly reduce the effectiveness of the lethality of DRC-1339 used for crows. Rain will reduce the potency, as will general exposure to light and other environmental elements. Multiple ingestion of lethal doses by crows will also have a reduced effect on the total numbers of crows susceptible to the bait. Presently, Oklahoma WS's take on crows is not expected to significantly exceed these past numbers in any one year. In addition to the sport harvest and WS's take, additional crows that are actually killed by the public under the authority of the standing Depredation Order to protect resources may never be known, as no formal reporting for take is required. In spite of these pressures from sport hunting and for resource

protection, the BBS population data for the period 1967 - 2001 in Oklahoma shows an increasing trend in the crow population (Sauer et al. 2001). In addition to these factors, BDM is conducted by WS only on those resource owners who request assistance, limiting the direct control activities to localized, specific sites rather than broad areas. This indicates cumulative mortality has not been high enough to cause any declines in crow populations in Oklahoma.

Waterfowl Population Impacts

Conservation efforts over the last several decades have provided an increase in the numbers of habitats and habitat quality improvements for waterfowl in the U.S. In response to the efforts by sportsmen, wildlife managers and other concerned individuals, waterfowl populations, particularly Canada geese and mallards, have flourished in recent years. BBS data indicates an upward trend in Canada goose and mallard numbers in Oklahoma since 1977 (Sauer et al. 2001). With this upward trend, Oklahoma's present day hunting seasons and bag limits are the most liberal in the state's history. Nationally, Canada goose numbers have grown from an estimated 1,110,000 in the late 1940's to 3,760,000 today. An average estimated take of Canada geese by sport hunting for the last three years in Oklahoma is 34,000 birds. WS killed only six Canada geese during the last five years. This not only includes take of target birds, but nontarget take as well. WS reported that no mallards were killed during the time period as a strategy to resolve any mallard-related damage problems (OK MIS). The estimated average number of mallards killed by sport hunting in Oklahoma for the last three years is 164,000 birds (ODWC 2002). Mortality from other sources can be high to local populations of waterfowl and cranes. In some years, unusual rainfall patterns during the peanut season in Oklahoma leaves many fields with unharvested peanuts that are exposed to moist conditions. These conditions can give rise to the growth of *Aspergillis sp.*, a group of naturally occurring fungi that produce mycotoxins that can kill wildlife that feed on affected grains. In southern Oklahoma during the 2000 peanut season, approximately 2,500 ducks, primarily mallards, were found dead and recovered by ODWC Biologists. Post-mortem and laboratory testing confirmed that these birds died from aflatoxin poisoning, a form of mycotoxin found on contaminated peanuts. Actual numbers of mallards killed by this natural poisoning could be from three to five times that number (M. O'Meilia, A. Peoples pers. commun., 2002). Botulism, caused from toxins produced by *Clostridium botulinum* bacteria, is a common disease in waterfowl and can have devastating effects on resident and migratory waterfowl populations. It occurs in all parts of the nation but is most prevalent in western and northern plains states. In certain years, mortality due to botulism in the west has been estimated at several million waterfowl (Davidson et al. 1988).

In spite of these cumulative natural and introduced factors that could impact waterfowl populations, most populations of Central Flyway waterfowl that use Oklahoma remain viable, especially in regard to Canada goose and mallard populations (M. O'Meilia, J. Brabrander pers. commun., 2003). Therefore,

cumulative impacts of mortality from all sources has not been great enough to result in significant impacts. The numbers of all waterfowl species taken by WS are in such low numbers that curtailing such actions by WS would have virtually no effect on overall waterfowl mortality or population status.

American Coot Population Impacts

American coots or "mud hens," are common, duck-sized, blackish-gray birds with a white bill and are distributed over most of the lower 48 States and in Canada (Larrison et al. 1967). Like several species of waterfowl, coots are omnivorous, with aquatic and terrestrial plants and invertebrates making up most of their diet.

BBS data indicate the coot population has been relatively stable across the western United States and has increased in the U.S. as a whole from 1968 through 1998 (Sauer et al. 2001). This information indicates WS BDM activities had no significant cumulative impact on the American coot as a species and that no significant cumulative impacts are expected to occur. No American coots have been taken during the last three years by WS in Oklahoma. Any future activities with coots would be limited to specific locations and local populations, safeguarding against any negative impacts to overall coot populations.

House Sparrow Population Impacts

House sparrows or English sparrows were introduced to North America from England in 1850 and have spread throughout the continent (Fitzwater 1994). The species is not protected by Federal or State laws. Like starlings and pigeons, because of their negative impacts and competition with native bird species, house sparrows are considered by many wildlife biologists, ornithologists, and naturalists to be an undesirable component of North American native ecosystems. House sparrows are found in nearly every habitat except dense forest, alpine, and desert environments. It prefers human-altered habitats, and is abundant on farms and in cities and suburbs (Robbins et al. 1983).

BBS population trends from 1967-00 indicate that house sparrows are decreasing in OK (Sauer et al. 2001). CBC data indicate the species declined by about 1.9% per year in North America from 1959 through 1988 (Sauer et al. 2001). Because they are still considered extremely abundant and are not afforded protection by Federal or State law, depredation permits are not required before they can be killed by the public.

Any BDM involving lethal control of house sparrows by WS would probably be restricted to individual sites. As stated previously, because house sparrows (also known as English sparrows) are not native to North America, any reduction in house sparrow populations, even to the extent of complete eradication, could be considered a beneficial impact on populations of native bird species. Therefore, any reduction in this species' populations in North America should not be

considered as having any significant adverse impact on the quality of the human environment. Historically in Oklahoma, WS has primarily utilized nonlethal methods for most situations regarding house sparrow damage management. During FY 2001, only one bird was taken by the WS program (OK MIS).

Egrets and Herons

Cattle egrets are white birds with long necks and legs. During their breeding season (spring to late summer), they have orange-buff plumes on their crowns, backs and napes. They are commonly seen feeding for insects among or near cattle. These birds are native to Portugal, Spain and Africa; they first appeared in South America around the turn of the century. It is thought that cattle egrets were self-introduced to the New World, perhaps after being caught in high winds or a storm system. Since the early 1960's, the cattle egret has increased in population size and has extended its range throughout North America (Terres 1991, Telfair 1983). In contrast to native egrets and herons that prefer to feed on fish and other aquatic organisms, cattle egrets feed on insects and vertebrate animals away from water. These food items include grasshoppers, spiders, toads, snakes, and small mammals. (Terres 1991, Telfair 1983).

Cattle egrets will most often nest in rookeries that have been previously established by great egrets, little blue herons, snowy egrets and black-crowned night herons. It has been suggested that the late nesting behavior by cattle egrets reduces aggression between species at rookeries and allows cattle egrets to use formally occupied territories. One study suggested that when cattle egrets did nest early, little blue heron nesting success was lowered (Telfair 1983). However, cattle egrets in Oklahoma typically nest later in the season, but will often still occupy the rookery for a period of time with great egrets, little blue herons and cattle egrets. The impact of the cattle egret on native egret and heron nesting success is unknown. Because rookery habitat quality typically degrades over time as the vegetation dies, an abundance of cattle egrets at a location could possibly reduce the quality of a particular rookery for native egrets and herons. Population trends for native egrets and herons remain stable, while trends for cattle egret populations are increasing (Sauer et al. 2001).

Over the last forty years that the cattle egret has been present in Oklahoma, it has gradually become accepted by the public as natural occurring fauna. Damage occurrences or conflicts with humans are often limited to a few individuals or properties. Cattle egrets account for most damage problems associated with egrets and herons in Oklahoma (Grant et al. 1995). Cattle egrets are often perceived as beneficial to the public since the egrets consume field insects. A campaign to extirpate cattle egrets from Oklahoma would not likely be acceptable to the public, or a practical endeavor for BDM. However, if non-native cattle egrets were to disappear from North America, there would likely be no impacts to insect populations, while some habitats would be positively affected.

All egrets (including cattle egrets) and herons, their nests, eggs and young are protected by the Migratory Bird Treaty Act; any form of take requires a permit from the USFWS. WS's actual take of egrets and herons is very limited. Lethal shooting is generally used to reinforce harassment methods and is conducted at specific locations where there is damage to a resource. Therefore WS BDM activities should have no significant cumulative impact on egrets and herons as a species, and no significant cumulative impacts are expected to occur. From FY98-FY01, the overall average take of cattle egrets by Oklahoma WS was 18 birds per year, with 71 birds taken in FY01. Cattle egrets are only present in Oklahoma during the breeding season and fledging (March-September), and most damage complaints occur during this time period and are directly associated with egret rookery development. Most Oklahoma rookeries contain 500-20,000 birds (Grant et al. 1995). Telfair (1983) studies of cattle egret rookeries estimated mortality at 1.1% in Texas. Any take by WS associated with these locations would not be predicted to exceed the rate of natural mortality.

Turkey Vultures and Black Vultures

Turkey and black vultures are large, black, soaring birds that are primarily carrion eaters. Black vultures are known to occasionally predate for food, however. Documentation exists on predation upon baby herons, domestic ducks, newborn calves, lambs, skunks, opossums, and young turtles (Terres 1991). Predation in Oklahoma occurs periodically and WS typically implements non-lethal techniques to disperse black vultures.

BBS population trend data from 1967 – 2000 in Oklahoma show a slightly increasing population for turkey vultures and a sharp increase for black vultures. (Sauer et al. 2001) Therefore, the cumulative take of these species, including the limited lethal removals conducted by WS has not been great enough to cause a decline in either species. The highest number of Black vultures taken by OK WS was 16 birds in FY2000. All turkey and black vulture take requires a permit from the USFWS.

Mississippi Kites

Oklahoma is a popular nesting location for Mississippi kites. These medium-sized (14" long) kites have pointed wings and a squared tail. Adults typically are dark gray dorsally, with light gray underparts. Kites arrive in the state in early April, and by May are establishing nests. They lay one to two eggs which hatch after approximately 31-32 days. The young fledge in another 34 days. The kites will then migrate in early September, a few weeks after the fledging of their young. During nesting, about 20% of kites intuitively dive, swoop and emit distress calls to fend off potential threats to eggs, nests, or young. All kites, their nests, eggs and young are protected by the Migratory Bird Treaty Act; any form of take requires a permit from the USFWS. BBS data indicates a declining trend in Mississippi kites in Oklahoma (Sauer et al. 2001). About half of nesting kites successfully raise young.

Major mortality factors include severe weather during nesting (chicks and eggs destroyed by high winds) and nest predators (raccoons, great-horned owls)(Andelt 1994). Adult mortality sometimes occurs from illegal take associated with intolerance of the kite's aggressive behavior. At times WS will take the nest, eggs, and/or chicks to halt the kite's attacks toward humans and pets. Eggs can be artificially incubated; however, hatching success is typically low. Another strategy is to place the confiscated eggs into the nests of non-aggressive kites in other areas (away from the general public), allowing them to incubate the pre-existing eggs. When chicks are involved, WS transports chicks to state licensed and Federally permitted rehabilitators, who then raise the chicks to be later returned to the wild. This alternative (current program) will likely contribute to the conservation of kite populations, as this strategy allows for a nonlethal approach for people who could be frustrated from dealing with kite harassment, provides a means for the captive chicks to be later released as adults, and because WS does not usually kill adult kites. In FY00, WS took 28 chicks to licensed rehabilitators as a nonlethal strategy to resolve human/kite conflicts (OK MIS). These chicks were later returned to the wild after fledging. Since this strategy has been employed for over twenty years, the proposed control strategies implemented under this alternative have been shown to have no significant impact on overall breeding populations.

Mourning Dove Impacts

Doves are smaller than pigeons, but they possess many of the same physical characteristics. They are fast-flying grayish-brown birds that usually feed on seeds or spilled grain. Doves are classified as migratory game birds that are managed by state game departments. Dove hunting is a popular sport in Oklahoma. BBS data indicates a slight declining trend in mourning doves in Oklahoma (Sauer et al. 2001). Estimated take by sport hunters during 2001 was 1.4 million birds (ODWC 2002). WS program activities rarely involve the direct control or actual take of doves. In FY 2001, nine doves were taken by WS, with none taken in the previous four years (OK MIS). In WS program actions, the anticipated number of doves killed by WS would be so low that no significant cumulative impacts would occur.

Other Target Species

In addition to the those species analyzed above, the take of other target species, including individual birds, nests or eggs by WS could include grebes, great horned owls, barred owls, turkeys, double-crested cormorants, horned larks, great blue herons, American robins, Northern cardinals, woodpeckers, fish crows, blue jays, magpies, Chihuahuan ravens, common ravens, meadow larks, horned larks and gulls. WS take of these species is expected to only total a few individual birds in any one year and should not rise to any level that would result in significant cumulative impacts on populations.

4.1.1.2 Alternative 2 - Nonlethal BDM Only by WS

Under this alternative, WS would not take any target species because no lethal methods would be used. Nonlethal harassment would be ineffective on some bird species, particularly pigeons, and some birds would quickly become habituated to harassment techniques. Although WS take of other target bird species such as feral domestic pigeons, blackbirds, and starlings would not occur, it is likely that, without WS conducting some level of lethal BDM activities for these species, private BDM efforts would increase, leading to potentially similar or even greater cumulative impacts on target species populations than those of the current program alternative. For the same reasons shown in the population impacts analysis in section 4.1.1.1, it is unlikely that starlings, pigeons, house sparrows, blackbirds, crows or other target bird populations would be impacted significantly by implementation of this alternative. Impacts and hypothetical risks of illegal chemical toxicant use under this alternative would probably be greater than the proposed action, about the same as Alternative 3, but less than under Alternative 4.

4.1.1.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would have no impact on feral domestic pigeons, blackbird, starling, crow, or other target species populations in the State because the program would not conduct any operational BDM activities but would be limited to providing advice only. Private efforts to reduce or prevent bird damage and perceived disease transmission risks could increase which could result in similar or even greater impacts on those populations than the current program alternative. For the same reasons shown in the population impacts analysis in section 4.1.1.1, however, it is unlikely that starlings, house sparrows, blackbirds, crows or other target bird populations would be impacted significantly by implementation of this alternative. DRC-1339 and the tranquilizer alpha-chloralose are currently only available for use by WS employees. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of other chemicals which could lead to real but unknown impacts on target bird populations. Impacts and hypothetical risks of illegal chemical toxicant use under this alternative would probably be about the same as those under Alternative 2.

4.1.1.4 Alternative 4 - No Federal WS BDM

Under this alternative, WS would have no impact on feral domestic pigeons, blackbird, starling, or other target species populations in the State. Private efforts to reduce or prevent depredations could increase which could result in impacts on target species populations to an unknown degree. Impacts on target species under this alternative could be the same, less, or more than those of the proposed action depending on the level of effort expended by private persons. For the same reasons shown in the population impacts analysis in section 4.1.1.1 it is unlikely that starlings, house sparrows, blackbirds, crows or other target bird populations would be impacted significantly by implementation of this alternative. DRC-1339 and the

tranquilizer alpha-chloralose are currently only available for use by WS employees. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of other chemicals which could lead to real but unknown impacts on target bird populations.

4.1.2 Effects on Nontarget Species Populations, Including Threatened and Endangered Species

4.1.2.1 Alternative 1 - Continue the Current Federal Bird Damage Management Program (The Proposed Action)

Adverse Impacts on Nontarget (non-T&E) Species. WS take of nontarget species during BDM activities has been extremely low. Due partially to the fact that BDM is not conducted on a large scale in Oklahoma, no nontarget take has occurred using mechanical methods for BDM. Although it is possible that some nontarget birds were unknowingly killed by use of DRC-1339 for pigeon or blackbird/starling control, the method of application is designed to minimize or eliminate that risk. For example, during projects where DRC-1339 is utilized, the appropriate type and size of bait material is selected to be the most acceptable to the target species. The treated bait is only applied after a period of prebaiting with untreated bait material and observation in which nontarget birds are not observed coming to feed at the site. In some cases, DRC-1339 is applied on elevated stands, platforms or other restricted locations to further minimize potential impacts to ground feeding birds or any other animals.

While every precaution is taken to safeguard against taking nontarget birds, at times changes in local flight patterns and other unanticipated events can result in the incidental take of unintended species. These occurrences are rare and should not affect the overall populations of any species under the current program.

Beneficial Impacts on Nontarget Species. Inter-specific nest competition has been well documented in starlings. Miller (1975) and Barnes (1991) reported starlings were responsible for a severe depletion of the eastern bluebird (*Sialis sialis*) population due to nest competition. Nest competition by starlings has also been known to adversely impact sparrow hawks or American kestrel (*Falco sparverius*) (Nickell 1967; Von Jarchow 1943; Wilmer 1987), red-bellied woodpeckers (*Centurus carolinus*), Gila woodpeckers (*Centurus uropygialis*) (Ingold 1994; Kerpez et.al. 1990), and wood ducks (*Aix sponsa*) (Shake 1967; Heusmann et.al. 1977; Grabill 1977; McGilvery et.al 1971). Weitzel (1988) reported 9 native species of birds in Nevada had been displaced by starling nest competition, and Mason et al. (1972) reported starlings evicting bats from nest holes. Control operations as proposed in this alternative could reduce local starling populations. Reduction in nest site competition would be a beneficial impact on the species listed above. Although such reductions are not likely to be significant over large areas, there could be some cases where some individuals limited by environmental factors could benefit by enhanced recruitment during nesting seasons.

T&E Species Impacts. T&E species that are federally listed (or proposed for listing) for the State of Oklahoma are listed in Appendix G. WS BDM would have no effect on any of the listed invertebrates, fish, reptiles, amphibians, or plants.

The 1992 Biological Opinion (B.O.) from the USFWS concluded that the brown pelican, interior least tern, and piping plover would not be adversely affected by any aspect of the WS program which included all methods of BDM described herein (USDA 1997, Appendix F). The 1992 B.O. also determined that the only BDM method that might adversely affect the bald eagle was above ground use of strychnine treated bait for "nuisance birds." Strychnine is no longer registered for above ground use and would not be used by WS for BDM in the State. DRC-1339 poses no primary hazard to eagles because eagles do not eat grain or other bait materials on which this chemical might be applied during BDM, and, further, because eagles are highly resistant to DRC-1339; up to 100 mg doses were force fed to captive golden eagles with no mortality or adverse effects noted other than regurgitation and head-shaking (Larsen and Dietrich 1970). Secondary hazards to raptors from DRC-1339 and Avitrol are low to nonexistent (see Appendix E). Therefore, WS BDM in OK will have no adverse effects on bald eagles. The 1992 B.O. determined that the only BDM methods that might adversely affect the American peregrine falcon (this species was delisted on 8/25/99 and is to be monitored for five years) was the above ground use of strychnine which could cause secondary poisoning if falcons consumed birds that had died from this chemical. However, strychnine is no longer registered for above ground use and would not be used by WS for BDM in the State. The USFWS found no concern about adverse effects on this species from DRC-1339 use in the 1992 B.O. Risks of secondary hazards from these chemicals for BDM would be exceedingly low (see Appendix E). Some forms of DRC-1339 use involving grain baits could conceivably have the potential to affect the Aleutian Canada goose (*Branta canadensis leucopareia*) and the whooping crane. Oklahoma is not within the historic range of the Aleutian Canada goose; thus, the species would not be affected by BDM in OK. DRC-1339 use for feral domestic pigeon control around or on buildings and structures would not affect the whooping crane because it is not known to occur at such sites. Field use of DRC-1339 is closely monitored at specific baiting locations, eliminating any hazards to whooping cranes. In the 1992 B.O., the USFWS concluded that toxicants used by the WS program would not jeopardize the whooping crane and that incidental take was not anticipated.

In 1999, Oklahoma WS entered into an informal consultation with the USFWS to address additional T/E species in Oklahoma that were not included in the original 1992 B.O. At that time a Biological Assessment was prepared (Appendix D) to evaluate potential impacts to the following T/E or proposed species: mountain plover (*Charadrius montanus*), red-cockaded woodpecker (*Picoides(=Dendrocopos) borealis*), Arkansas river shiner (*Notropis girardi*), American burying beetle (*Nicrophorus americanus*), and the scaleshell mussel (*Leptodea leptodon*). The USFWS concurred with the WS determination that the

current program is "...not likely to adversely affect any of the listed or proposed species".

Mitigation measures to avoid T&E impacts were described in Chapter 3 (section 3.5.2.2) and are also described in section 4.1.4.1 of this chapter. The inherent safety features of DRC- 1339 use that preclude or minimize hazards to mammals and plants are described in Appendix **G** and in a formal risk assessment in the ADC FEIS (USDA 1997, Appendix P). Those measures and characteristics should assure there would be no jeopardy to T&E species or adverse impacts on mammalian or non-T&E bird scavengers from the proposed action. None of the other control methods described in the proposed action alternative pose any hazard to nontarget or T&E species. Examples of potential benefits to a listed T&E species would be the reduction of local cowbird populations which could reduce nest parasitism on the endangered black-capped vireo, and/or the management of birds that could directly predate on adult interior least terns, their nests, eggs or young.

4.1.2.2 Alternative 2 - Nonlethal BDM Only by WS

Under this alternative, WS take of nontarget animals would probably be less than that of the proposed action because no lethal control actions would be taken by WS. However, nontarget take would not differ substantially from the current program because the current program takes very few nontarget animals. On the other hand, parties whose bird damage problems were not effectively resolved by nonlethal control methods would likely resort to other means of lethal control such as use of shooting by private persons or even illegal use of chemical toxicants. This could result in less experienced persons implementing control methods and could lead to greater take of nontarget wildlife than the proposed action. For example, shooting by persons not proficient at bird identification could lead to killing of nontarget birds. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants which could lead to unknown impacts on local nontarget species populations, including T&E species. Hazards to raptors, including bald eagles and falcons, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

4.1.2.3 Alternative 3 - Technical Assistance Only

Alternative 3 would not allow any WS direct operational BDM in the area. There would be no impact on nontarget or T&E species by WS activities from this alternative. Technical assistance or self-help information would be provided at the request of producers and others. Although technical support might lead to more selective use of control methods by private parties than that which might occur under Alternative 2, private efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods leading to greater take of nontarget wildlife than under the proposed action. It is hypothetically

possible that, similar to but probably less than under Alternative 2, frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants which could lead to unknown impacts on local nontarget species populations, including some T&E species. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

4.1.2.4 Alternative 4 - No Federal WS Bird Damage Management

Alternative 4 would not allow any WS BDM in the State. Nontarget take should not differ substantially from the current program because the current program takes very few nontarget animals. However, parties with bird damage problems would likely resort to other means of control such as use of shooting by private persons or even illegal use of chemical toxicants. There would be no impact on nontarget or T&E species by WS BDM activities from this alternative. However, private efforts to reduce or prevent depredations could increase which could result in less experienced persons implementing control methods and could lead to greater take of nontarget wildlife than under the proposed action. It is hypothetically possible that frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants which could impact local nontarget species populations, including some T&E species. Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated private individuals.

4.1.3 Impacts of Chemical BDM methods on Human Health and Safety

4.1.3.1 Alternative 1 -Continue the Current Program (Proposed Action)

DRC-1339 (3-chloro-p-toluidine hydrochloride). DRC-1339 is the primary lethal chemical BDM method that would be used under the current program alternative. There has been some concern expressed by a few members of the public that unknown but significant risks to human health may exist from DRC-1339 used for BDM.

On average, the Oklahoma WS program used less than 500 grams of DRC-1339 per year during the past 3 years. Therefore, actual use of this chemical by WS in the State has been extremely low. This chemical is one of the most extensively researched and evaluated pesticides ever developed. Over 30 years of studies have demonstrated the safety and efficacy of this compound. Appendix E provides more detailed information on this chemical and its use in BDM. Factors that virtually eliminate any risk of public health problems from use of this chemical are:

- Federal label and State law requires that the chemical be applied only by an individual trained and certified in its use; that the chemical be applied

under strict guidelines in regard to suitable locations and bait materials to be used.

- DRC-1339 is highly unstable and degrades rapidly when exposed to sunlight, heat, or ultraviolet radiation. The half-life is about 25 hours, which means that the chemical on treated bait material generally is nearly 100% broken down within a week.

- The chemical is more than 90% metabolized in target birds within the first few hours after they consume the bait. Therefore, little material is left in bird carcasses that may be found or retrieved by people.

- The application rates are extremely low (less than 0.1 lb. of active ingredient per acre) (EPA 1995).

- A human would need to ingest the internal organs of birds found dead from DRC-1339 to have any chance of receiving even a minute amount of the chemical or its metabolites into his/her system. This is highly unlikely to occur.

- The EPA has concluded that, based on mutagenicity (the tendency to cause gene mutations in cells) studies, this chemical is not a mutagen or a carcinogen (i.e., cancer-causing agent) (EPA 1995). Regardless, however, the extremely controlled and limited circumstances in which DRC-1339 is used would prevent any exposure of the public to this chemical.

The above analysis indicates that human health risks from DRC-1339 use would be virtually nonexistent under any alternative.

Avitrol (4-Aminopyridine). Avitrol is another chemical method that might be used by WS in BDM. Although this chemical was not identified as being one of concern for human health effects, analysis of the potential for adverse effects is presented here. Appendix E provides more detailed information on this chemical.

Avitrol is available as a prepared grain bait mixture that is mixed in with clean bait at no greater than a 1:9 treated to untreated mixture. Recent use has been extremely limited in the OK WS program. In addition to this factor, other factors that virtually eliminate health risks to members of the public from use of this product are:

- Federal label and State law requires that the chemical be applied only by an individual trained and certified in its use; that the chemical be applied under strict guidelines.

- It is readily broken down or metabolized into removable compounds that are excreted in urine in the target species (ETOXNET 1996). Therefore, little of the chemical remains in killed birds to present a

hazard to humans.

- A human would need to ingest the internal organs of birds found dead from Avitrol ingestion to have any chance of receiving even a minute amount of the chemical or its metabolites into his/her system. This is highly unlikely to occur. Furthermore, secondary hazard studies with mammals and birds have shown that there is virtually no hazard of secondary poisoning.

- Although Avitrol has not been specifically tested as a cancer-causing agent, the chemical was found not to be mutagenic in bacterial organisms (EPA 1997) . Therefore, the best scientific information available indicates it is not a carcinogen. Regardless, however, the extremely controlled and limited circumstances in which Avitrol is used would prevent exposure of members of the public to this chemical.

The above analysis indicates that human health risks from Avitrol use would be virtually nonexistent under any alternative.

Other BDM Chemicals. Other nonlethal BDM chemicals that might be used or recommended by WS if they become registered would include repellents such as methyl anthranilate (artificial grape flavoring used in foods and soft drinks sold for human consumption), which has been used as an area repellent and is currently being researched as a livestock feed additive, tactile polybutene repellents and the tranquilizer drug Alpha-chloralose. Such chemicals must undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before they would be registered by EPA or FDA. Any operational use of chemical repellents would be in accordance with labeling requirements under FIFRA and state pesticide laws and regulations which are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on human health.

Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997).

4.1.3.2 Alternative 2 - Nonlethal BDM Only by WS

Alternative 2 would not allow for any lethal methods use by WS in the State. WS could only implement nonlethal methods such as harassment and exclusion devices and materials. Nonlethal methods could, however, include the tranquilizer drug Alpha-chloralose and chemical repellents such as polybutene tactile repellents and methyl anthranilate which, although already considered safe for human consumption because it is artificial grape flavoring, which might nonetheless raise

concerns about human health risks. Such chemicals must undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before they would be registered by EPA or FDA. Any operational use of chemical repellents and tranquilizer drugs would be in accordance with labeling requirements under FIFRA and state pesticide laws and regulations and FDA rules which are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions is a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on human health.

Excessive cost or ineffectiveness of nonlethal techniques could result in some entities rejecting WS's assistance and resorting to other means of BDM. Such means could include the use of illegal pesticides that could have greater potential for adverse effects on human health.

4.1.3.3 Alternative 3 - Technical Assistance Only

Alternative 3 would not allow any direct operational BDM assistance by WS in the State. WS would only provide advice and, in some cases, equipment or materials (i.e., by loan or sale) to other persons who would then conduct their own damage management actions. Concerns about human health risks from WS's use of chemical BDM methods would be alleviated because no such use would occur. DRC-1339 is only registered for use by WS personnel and would not be available for use by private individuals except certified applicators under the direct supervision of WS personnel. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and leading to a greater risk than the No Action/Proposed Action alternative. However, because some of these private parties would be receiving advice and instruction from WS, concerns about human health risks from chemical BDM methods use should be less than under Alternative 2. Commercial pest control services would be able to use Avitrol and such use would likely occur to a greater extent in the absence of WS's assistance. Use of Avitrol in accordance with label requirements should avoid any hazard to members of the public. Hazards to humans and pets could be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used. It is hypothetically possible that frustration caused by the inability to alleviate bird damage could lead to illegal use of certain toxicants that, unlike WS's controlled use of DRC-1339 and Avitrol, could pose secondary poisoning hazards to pets and to mammalian and avian scavengers. Some chemicals that could be used illegally would present greater risks of adverse effects on humans than those used under the current program alternative.

4.1.3.4 Alternative 4 - No Federal WS Bird Damage Management

Alternative 4 would not allow any WS BDM in the State. Concerns about human health risks from WS's use of chemical BDM methods would be alleviated because no such use would occur. DRC-1339 and the capture drug Alpha-chloralose are

only registered for use by WS personnel and would not be available for use by private individuals. Private efforts to reduce or prevent damage would be expected to increase, resulting in less experienced persons implementing damage management methods and potentially leading to greater risk to human health and safety than the Current Program alternative. Commercial pest control services would be able to use Avitrol and such use would likely occur to a greater extent in the absence of WS's assistance. However, use of Avitrol in accordance with label requirements should avoid any hazard to members of the public. However, hazards to humans and pets could be greater under this alternative if other chemicals that are less selective or that cause secondary poisoning are used. It is hypothetically possible that frustration caused by the inability to alleviate bird damage could lead to illegal use of certain toxicants that, unlike WS's controlled use of DRC-1339 and Avitrol, could pose secondary poisoning hazards to pets and to mammalian and avian scavengers. Some chemicals that could be used illegally would present greater risks of adverse effects on humans than those used under the current program alternative.

4.1.4 Impacts of Nonchemical BDM Methods on Human Health and Safety

4.1.4.1 Alternative 1 - Continue the Current Program (Proposed Action)

Nonchemical BDM methods that might raise safety concerns include shooting with firearms and harassment with pyrotechnics. Firearms are only used by WS personnel who are experienced in handling and using them. WS personnel receive safety training on an annual basis to keep them aware of safety concerns. The OK WS program has had no accidents involving the use of firearms, pyrotechnics or traps in which a member of the public was harmed. A formal risk assessment of WS's operational management methods found that risks to human safety were low (USDA 1997, Appendix P). Therefore, no significant impact on human safety from WS's use of these methods is expected.

4.1.4.2 Alternative 2 - No Federal WS Bird Damage Management

Under this alternative, WS would not engage in or recommend use of any nonchemical BDM methods. Risks to human safety from WS's use of firearms and pyrotechnics would nor occur. However, increased use of firearms and pyrotechnics by less experienced and trained private individuals would probably occur without WS assistance. Therefore, risks to human safety would probably increase under this alternative.

4.1.4.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would not engage in direct operational use of any nonchemical BDM methods. Risks to human safety from WS's use of firearms, pyrotechnics and traps would not occur. Increased use of firearms and pyrotechnics by less experienced and trained private individuals would probably occur without

WS direct operational assistance which would likely increase human safety risks, Similar to Alternative 2.

4.1.4.4 Alternative 4 - Nonlethal Required Before Lethal

Under this alternative, WS would not initially use trapping or shooting for lethal control during BDM, but would still be able to use shooting as a harassment method. Pyrotechnics would also be used by WS. Risks to human safety from WS's use of firearms and pyrotechnics would be the same as the current program alternative. OK WS's current BDM program has an excellent safety record in which no accidents involving the use of these devices have occurred that have resulted in a member of the public being harmed. Decrease in initial use of lethal shooting or trapping by WS could increase use of firearms or trapping by less experienced and trained private individuals under this alternative, which would likely increase human safety risks somewhat. Similar to Alternatives 2 and 3, however, it is unlikely that these increased risks would become significant.

4.1.5 Effects on Human Health and Safety by Nuisance Birds for which BDM is Requested

4.1.5.1 Alternative 1 - Continue the Current Program (Proposed Action)

As discussed in Chapter 1, bird strikes with aircraft can lead to human injuries and loss of life. Also, feral domestic pigeons, European starlings, blackbirds, and English sparrows can all carry diseases that are transmissible to humans and that can adversely affect human health. In most cases, it is difficult to conclusively prove that birds were responsible for transmission of individual human cases or outbreaks of bird-borne diseases. Nonetheless, certain requesters of BDM service may consider this risk to be unacceptable and may request such service primarily for that reason. In such cases, BDM, either by lethal or nonlethal means, would, if successful, reduce the risk of bird strikes and bird-borne disease transmission at the site for which BDM is requested.

In some situations such as those involving urban feral domestic pigeons, the implementation of nonlethal controls such as electric or porcupine wires, netting barriers, etc. could actually increase the risk of human health problems at other sites by causing the birds to move to other urban roosting sites not previously affected. In such cases, lethal removal of the birds may actually be the best alternative from the standpoint of overall human health concerns in the local area.

Aside from human health concerns, another reason lethal removal may be a better alternative is that the costs of nonlethal exclusion would likely have to be borne at each new site where the displaced birds reestablished roosting and nesting habits. The costs of installing and maintaining nonlethal exclusion methods at multiple sites could be much greater, even over the long term, than the cost of periodic lethal control using DRC-1339.

4.1.5.2 Alternative 2 - Nonlethal BDM Only by WS

Under this alternative, WS would be restricted to implementing only nonlethal methods in providing assistance with bird damage problems. Entities requesting BDM assistance for human health or safety concerns would only be provided information on nonlethal barriers or exclusion devices, habitat alteration, or other nonlethal methods such as harassment. Because some of these nonlethal methods would likely be effective at the individual sites where they are used, this alternative would likely create or increase human health or safety risks at other locations to where the birds would then move. Some requesting entities such as city government officials would reject WS assistance for this reason and would likely seek to achieve bird control (e.g., urban pigeon problems) by other means. Because DRC-1339 would not be available for use by non-WS personnel, it may be difficult to achieve local population reduction. In such cases, human health and safety risks may remain the same or become worse. Also, under this alternative, human health problems or aircraft bird strike risks would probably increase if private individuals were unwilling to implement nonlethal control methods because of high cost or lack of faith in their effectiveness, or if they were unable to hire other entities to conduct effective BDM for human health concerns.

4.1.5.3 Alternative 3 - Technical Assistance Only

With WS technical assistance but no direct operational assistance, entities requesting BDM for human health and safety concerns would either (1) not take any action which means the risk of human health and safety problems would continue or would increase in each situation as bird numbers maintained or increased, (2) implement WS recommendations for nonlethal barriers and exclusions site-by-site, which would most probably result in birds relocating to other buildings and structures creating or increasing human health and safety risks at new sites, or (3) undertake or hire bird control using cage traps, shooting, or Avitrol. DRC-1339 would not be available for use except by certified applicators under the direct supervision of WS personnel. Under this alternative, human health and safety problems could increase if private individuals were unable to achieve effective BDM with technical assistance alone, or if they were unable to hire other entities to conduct effective BDM for human health and safety concerns.

4.1.5.4 Alternative 4 - No Federal WS Bird Damage Management

With no WS assistance, private individuals,community government officials, or airports would either (1) not take any action which means the risk of human health problems would continue or would increase in each situation as bird numbers maintained or increased, (2) implement nonlethal barriers and exclusions site-by-site, which would most probably result in birds relocating to other buildings and structures creating or increasing human health and safety risks at new sites, or (3) conduct bird control using cage traps, shooting, or Avitrol. A primary difference

between this alternative and the proposed action is that DRC-1339 would not be available. Under this alternative, human health and safety problems could increase if private individuals were unable to find and implement effective means of controlling birds that cause similar types of nuisance or strike risk problems.

4.1.6 Effects on Human Affectionate-Bonds with Individual Birds and on Aesthetic Values of Wild Bird Species

4.1.6.1 Alternative 1 - Continue the Current Program (Proposed Action)

Some people who routinely view or feed individual birds such as feral domestic pigeons or urban waterfowl would likely be disturbed by removal of such birds under the current program. WS is aware of such concerns and has taken it into consideration in some cases to mitigate them. For example, in urban situations where waterfowl are damaging resources, WS could selectively capture the target species (coots, ducks, geese, etc.) utilizing Alpha-chloralose or trapping without disturbing the other waterfowl species that are present and deemed enjoyable to the public. This strategy could also be utilized on individual birds that could be creating a damage problem. This type of consideration can help to mitigate adverse effects on local peoples' enjoyment of certain individual birds or groups of birds.

Some people have expressed opposition to the killing of any birds during BDM activities. Under the current program, some lethal control of birds would continue and these persons would continue to be opposed. However, many persons who voice opposition have no direct connection or opportunity to view or enjoy the particular birds that would be killed by WS's lethal control activities. Lethal control actions would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would therefore continue to remain available for viewing by persons with that interest.

Some people do not believe that herons and egrets, geese, or nuisance blackbird or starling roosts should even be harassed to stop or reduce damage problems. Some people who enjoy viewing birds could feel their interests are harmed by WS's nonlethal bird harassment activities. Mitigating any such impact, however, is the fact that overall numbers of birds in the area would not be diminished by the harassment program and people who like to view these species could still do so on State wildlife management areas, National Wildlife Refuges, or on numerous private property sites where the owners are not experiencing damage to the birds and are tolerant of their presence.

4.1.6.2 Alternative 2 - Nonlethal BDM Only by WS

Under this alternative, WS would not conduct any lethal BDM but would still conduct harassment of birds that cause damage. Some people who oppose lethal control of wildlife by government but are tolerant of government involvement in

nonlethal wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS's activities under this alternative because the individual birds would not be killed by WS. However, other private entities would likely conduct similar BDM activities as those that would no longer be conducted by WS which means the impacts would then be similar to the current program alternative.

4.1.6.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any direct operational BDM but would still provide technical assistance or self-help advice to persons requesting assistance with bird damage. WS would also not conduct any harassment of crows, egrets, herons and geese and other birds that were causing damage. Some people who oppose direct operational assistance in wildlife damage management by the government but favor government technical assistance would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS's activities under this alternative because the individual birds would not be killed by WS. However, other private entities would likely conduct similar BDM activities as those that would no longer be conducted by WS which means the impacts would then be similar to the current program alternative.

4.1.6.4 Alternative 4 - No Federal WS Bird Damage Management

Under this alternative, WS would not conduct any lethal removal of birds nor would the program conduct any harassment of crows, egrets, herons, geese or other birds. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS's activities under this alternative. However, other private entities would likely conduct similar BDM activities as those that would no longer be conducted by WS which means the impacts would then be similar to the current program alternative.

4.1.7 Effects on Aesthetic Values of Property Damaged by Birds

4.1.7.1 Alternative 1 - Continue the Current Program (Proposed Action)

Under this alternative, operational assistance in reducing nuisance pigeon and other bird problems in which droppings from the birds cause unsightly mess would improve aesthetic values of affected properties in the view of property owners and managers.

Relocation of nuisance roosting or nesting population of birds (e.g., blackbird/starling roosts, egret/heron rookeries) by harassment can sometimes result in the birds causing the same or similar problems at the new location. If WS is providing direct operational assistance in relocating such birds, coordination with local authorities to monitor the birds' movements is generally conducted to assure they do not reestablish in other undesirable locations.

4.1.7.2 Alternative 2 - Nonlethal BDM Only by WS

Under this alternative, WS would be restricted to nonlethal methods only. Nuisance pigeon problems would have to be resolved by nonlethal barriers and exclusion methods. Assuming property owners would choose to allow and pay for the implementation of these types of methods, this alternative would result in nuisance pigeons and other birds relocating to other sites where they would likely cause or aggravate similar problems for other property owners. Thus, this alternative would most likely result in more property owners experiencing adverse effects on the aesthetic values of their properties than the current program alternative. Many of the current materials for used barriers (netting, metal flashing, wire, etc) could, in some cases, reduce the aesthetic property value.

4.1.7.3 Alternative 3 - Technical Assistance Only

Under this alternative, the lack of operational assistance in reducing nuisance pigeon and other bird problems would mean aesthetic values of some affected properties would continue to be adversely affected but this would not occur to as great a degree as under the No Program Alternative. This is because some of these property owners would be able to resolve their problems by following WS's technical assistance recommendations.

Relocation of nuisance roosting or nesting population of birds (e.g., blackbird/starling roosts, heron rookeries) through harassment, barriers, or habitat alteration can sometimes result in the birds causing the same problems at the new location. If WS has only provided technical assistance to local residents or municipal authorities, coordination with local authorities to monitor the birds' movements to assure the birds do not reestablish in other undesirable locations might not be conducted. In such cases, limiting WS to technical assistance only could result in a greater chance of adverse impacts on aesthetics of property owners at other locations than the current program alternative.

4.1.7.4 Alternative 4 - No Federal WS Bird Damage Management

Under this alternative, the lack of any operational or technical assistance in reducing nuisance pigeon and other bird problems in which droppings from the birds cause unsightly mess would mean aesthetic values of some affected properties would continue to be adversely affected if the property owners were not able to achieve BDM some other way. In many cases, this type of aesthetic "damage" would worsen because property owners would not be able to resolve their problems and bird numbers would continue to increase.

4.1.8 Humaneness of Lethal Bird Control Methods

4.1.8.1 Alternative 1 - Continue the Current Program (Proposed Action)

Under this alternative, methods viewed by some persons as inhumane would continue to be used in BDM by WS. These methods would include shooting and toxicants/chemicals such as DRC-1339 and Avitrol.

Shooting, when performed by experienced professionals, usually results in a quick death for target birds. Occasionally, however, some birds are initially wounded and must be shot a second time or must be caught by hand and then dispatched or euthanized. Some persons would view shooting as inhumane.

The primary lethal chemical BDM method that would be used by WS under this alternative would be DRC-1339. This chemical causes a quiet and apparently painless death that results from uremic poisoning and congestion of major organs (Decino et al. 1966). The birds become listless and lethargic, and a quiet death normally occurs in 24 to 72 hours following ingestion. The method appears to result in a less stressful death than that which probably occurs by most natural causes which are primarily disease, starvation, and predation. For these reasons, WS considers DRC-1339 use under the current program to be a relatively humane method of lethal BDM. However, despite the apparent painlessness of the effects of this chemical, some persons will view any method that takes a number of hours to cause death as inhumane and unacceptable.

The chemical Avitrol repels birds by poisoning a few members of a flock, causing them to become hyperactive (see discussion in Appendix E). Their distress calls generally alarm the other birds and cause them to leave the site. Only a small number of birds need to be affected to cause alarm in the rest of the flock. The affected birds generally die. In most cases where Avitrol is used, only a small percentage of the birds are affected and killed by the chemical with the rest being merely frightened away. Some persons would view Avitrol as inhumane treatment of the birds that are affected by it based on the birds' erratic distress behaviors.

Occasionally, birds captured alive by use of the tranquilizer Alpha-chloralose, cage traps, or by hand or with nets would be euthanized. The most common method of euthanization would be by CO_2 gas which is an AVMA-approved euthanasia method. Most people would view AVMA-approved euthanization methods as humane.

4.1.8.2 Alternative 2 - Nonlethal BDM Only by WS

Under this alternative, lethal methods viewed as inhumane by some persons would not be used by WS. However, it is expected that many requesters of BDM assistance would reject nonlethal methods recommended by WS and/or would not

be willing to pay the extra cost of implementing and maintaining them and would seek alternative lethal means.

The only chemical BDM methods that could be legally used by state certified pesticide applicators would be Avitrol and Starlicide Complete. Starlicide Complete is a manufactured bait pellet that contains .1% DRC-1339 chemical. The use of the Starlicide Complete would be limited, as the pesticide label specifies the product's use on blackbirds and starlings at cattle feedlots and holding pens, and at poultry buildings and yards. The DRC-1339 technical product would not be available to non-WS entities. Avitrol would most likely be viewed as less humane than DRC-1339 because of the distress behaviors that it causes.

Shooting could be used by non-WS entities and, similar to the current program alternative, would be viewed by some persons as inhumane. Shooting could be attempted by less experienced persons, or individuals with no training or by individuals with inadequate firearms, resulting in unnecessary wounding or injury to animals, increasing suffering.

Alpha-chloralose would not be available to non-WS entities. However, live trapping/capture by other methods and euthanization by CO_2 gas could be used by these entities.

Overall, it is likely that BDM would actually be somewhat less humane with this alternative than under the current program alternative.

4.1.8.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any lethal or nonlethal BDM, but would provide self-help advice only. Thus, lethal methods viewed as inhumane by some persons would not be used by WS.

Without WS direct operational assistance, it is expected that many requesters of BDM would reject nonlethal recommendations or would not be willing to pay the extra cost of implementing and maintaining them and would seek alternative lethal means.

Similar to Alternative 2, DRC-1339 would no longer be available for use since it is only registered for use by or under the direct supervision of WS personnel. Thus, the only chemical BDM method legally available would be Avitrol which would be viewed by many persons as less humane than DRC-1339.

The other lethal method that would likely be used more by non-WS entities would be shooting which would also be viewed by some persons as inhumane. Shooting could be attempted by less experienced persons, or individuals with no training or by individuals with inadequate firearms, resulting in unnecessary wounding or injury to animals, increasing suffering.

Alpha-chloralose would not be available to non-WS entities. However, live trapping/capture by other methods and euthanization by CO_2 gas could be used by these entities.

Overall, BDM under this alternative would likely be somewhat less humane than the current program alternative but slightly more humane than Alternative 2.

4.1.8.4 Alternative 4 - No Federal WS Bird Damage Management

Under this alternative, lethal methods viewed as inhumane by some persons would not be used by WS. However, it is expected that many requesters of BDM assistance would reject the use of nonlethal methods as being impractical or too expensive to implement and maintain and would seek alternative lethal means.

Similar to Alternative 2, DRC-1339 would no longer be available for use since it is only registered for use by or under the direct supervision of WS personnel. Thus, the only chemical BDM method legally available would be Avitrol which would be viewed by many persons as less humane than DRC-1339. In these situations, BDM would most likely be less humane than under the current program alternative.

Shooting could be used by non-WS entities and, similar to the current program alternative, would be viewed by some persons as inhumane. As in Alternative 3, shooting could be attempted by less experienced persons, or individuals with no training or by individuals with inadequate firearms, resulting in unnecessary wounding or injury to animals, increasing suffering.

Alpha-chloralose would not be available to non-WS entities. However, live trapping/capture by other methods and euthanization by CO_2 gas could be used by these entities.

Overall, it is likely that BDM would actually be somewhat less humane with this alternative than under the current program alternative or any of the other alternatives.

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APPENDIX A

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WS Directive 2.501 Translocation of Wildlife

WS Directive 2.615 Firearms Use and Safety

APPENDIX B

DISEASES TRANSMITTABLE TO HUMANS AND LIVESTOCK ASSOCIATED WITH FERAL PIGEONS, STARLINGS AND ENGLISH SPARROWS (Weber 1979).

Disease	Human Symptoms	Potential for Human Fatality	Effects on Domestic Animals
Bacterial:			
erysipeloid	skin eruption with pain, itching; headaches, chills, joint pain, prostration, fever, vomiting	sometimes - particularly to young children, old or infirm people	serious hazard for the swine industry
salmonellosis	gastroenteritis, septicaemia, persistent infection	possible, especially in individuals weakened by other disease or old age	causes abortions in mature cattle, possible mortality in calves, decrease in milk production in dairy cattle
Pasteurellosis	respiratory infection, nasal discharge, conjunctivitis, bronchitis, pneumonia, appendicitis, urinary bladder inflammation, abscessed wound infections	rarely	may fatally affect chickens, turkeys and other fowl
Listeriosis	conjunctivitis, skin infections, meningitis in newborns, abortions, premature delivery, stillbirth	sometimes - particularly with newborns	In cattle, sheep, and goats, difficulty swallowing, nasal discharge, paralysis of throat and facial muscles
Viral:			
meningitis	inflammation of membranes covering the brain , dizziness, and nervous movements	possible — can also result as a secondary infection with listeriosis, salmonellosis, cryptococcosis	causes middle ear infection in swine, dogs, and cats
encephalitis (8 forms)	headache, fever, stiff neck, vomiting, nausea, drowsiness, disorientation	mortality rate for eastern equine encephalomyelitis may be around 60%	may cause mental retardation, convulsions and paralysis
Mycotic (fungal):			
aspergillosis	affects lungs and broken skin, toxins poison blood, nerves, and body cells	not usually	causes abortions in cattle
blastomycosis	weight loss, fever, cough, bloody sputum and chest pains.	rarely	affects horses, dogs and cats
candidiasis	infection of skin, fingernails, mouth, respiratory system, intestines, and urogenital tract	rarely	causes mastitis, diarrhea, vaginal discharge and aborted fetuses in cattle
cryptococcosis	lung infection, cough, chest pain, weight loss, fever or dizziness, also causes meningitis	possible especially with meningitis	chronic mastitis in cattle, decreased milk flow and appetite loss
histoplasmosis	pulmonary or respiratory disease. May affect vision	possible, especially in infants and young children or if disease disseminates to the blood and bone marrow	actively grows and multiplies in soil and remains active long after birds have departed
Protozoal:			
American trypanosomiasis	infection of mucous membranes of eyes or nose, swelling	possible death in 2-4 weeks	caused by the conenose bug found on pigeons
toxoplasmosis	inflammation of the retina, headaches, fever, drowsiness, pneumonia, strabismus, blindness, hydrocephalus, epilepsy, and deafness	possible	may cause abortion or still birth in humans, mental retardation
Rickettsial/ Chlamydial:			
chlamydiosis	pneumonia, flu-like respiratory infection, high fever, chills, loss of appetite, cough, severe headaches, generalized aches and pains, vomiting, diarrhea, hepatitis, insomnia, restlessness, low pulse rate	occasionally, restricted to old, weak or those with concurrent diseases	in cattle, may result in abortion, arthritis, conjunctivitis, and enteritis
Q fever	sudden pneumonitis, chills, fever, weakness, severe sweating, chest pain, severe headaches and sore eyes	possible	may cause abortions in sheep and goats

APPENDIX C

DISEASES OF LIVESTOCK LINKED TO FERAL PIGEONS, STARLINGS, BLACKBIRDS AND ENGLISH SPARROWS (Weber 1979).

Disease	Livestock affected	Symptoms	Comments
Bacterial:			
erysipeloid	cattle, swine, horses, sheep, goats, chickens, turkeys, ducks	Pigs - arthritis, skin lesions, necrosis, septicemia Sheep - lameness	serious hazard for the swine industry, rejection of swine meat at slaughter due to speticemia, also affects dogs
salmonellosis	all domestic animals	abortions in mature cattle, mortality in calves, decrease in milk production in dairy cattle Colitis in pigs,	over 1700 serotypes
Pasteurellosis	cattle, swine, horses, rabbits, chickens, turkeys	Chickens and turkeys die suddenly without illness pneumonia, bovine mastitis, abortions in swine, septicemia, abscesses	also affects cats and dogs
avian tuberculosis	chickens, turkeys, swine, cattle, horses, sheep	Emaciation, decrease in egg production, and death in poultry. Mastitis in cattle	also affects dogs and cats
Streptococcosis	cattle, swine, sheep, horses, chickens, turkeys, geese, ducks, rabbits	Emaciation and death in poultry. Mastitis in cattle, abscesses and inflamation of the heart, and death in swine	feral pigeons are susceptable and aid in transmission
yersinosis	cattle, sheep, goats, horses, turkeys, chickens, ducks	abortion in sheep and cattle	also affects dogs and cats
Vibriosis	cattle and sheep	In cattle, often a cause of infertility or early embryonic death. In sheep, the only known cause of infectious abortion in late pregnancy	of great economic importance
Listeriosis	Chickens, ducks, geese, cattle, horses, swine, sheep, goats	In cattle, sheep, and goats, difficulty swallowing, nasal discharge, paralysis of throat and facial muscles	also affects cats and dogs
Viral:			
meningitis	cattle, sheep, swine, poultry	inflamation of the brain, newborn calve unable to suckle	associated with listeriosis, salmonellosis, cryptococcosis
encephalitis (8 forms)	horses, turkeys, ducks	drowsiness, inflamation of the brain	mosquitos serve as vectors
Mycotic (fungal):			
aspergillosis	cattle, chickens, turkeys, and ducks	abortions in cattle	common in turkey poults
		Rarely	affects horses, dogs and cats
candidiasis	cattle, swine, sheep, horses, chickens, turkeys	In cattle, mastitis, diarrhea, vaginal discharge, and aborted fetuses	causes unsatisfactory growth in chickens
cryptococcosis	cattle, swine, horses	chronic mastitis in cattle, decreased milk flow and appetite loss	also affects dogs and cats
histoplasmosis	horses cattle and swine	(in dogs) chronic cough, loss of appetite, weakness, depression, diarrhea, extreme weight loss	also affects dogs; actively grows and multiplies in soil and remains active long after birds have departed
Protozoal:			
Coccidiosis	poultry, cattle, and sheep	bloody diarrhea in chickens, dehydration, retardation of growth	almost always present in English sparrows; also found in pigeons and starlings
American trypanosomiasis	infection of mucous membranes of eyes or nose, swelling	possible death in 2-4 weeks	caused by the conenose bug found on pigeons
toxoplasmosis	cattle, swine, horses, sheep, chickens, turkeys	In cattle, muscular tremors, coughing, sneezing, nasal discharge, frothing at the mouth, prostration and abortion	also affects dogs and cats
Rickettsial/Chlamydial:			
chlamydiosis	cattle, horses, swine, sheep, goats, chickens, turkeys, ducks, geese	In cattle, abortion, arthritis, conjunctivitis, enteritis	also affects dogs and cats and many wild birds and mammals
Q fever	affects cattle, sheep, goats, and poultry	may cause abortions in sheep and goats	can be transmitted by infected ticks

APPENDIX D

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
222 S. Houston, Suite A
Tulsa, Oklahoma 74127

December 10, 1999

#2-14-00-I-217

Mr. John E. Steuber
State Director, Oklahoma Wildlife Services
2800 North Lincoln Blvd.
Oklahoma City, OK 73105-4298

Dear Mr. Steuber,

This responds to your letter dated November 8, 1999, requesting concurrence with the determination that the actions being conducted by Oklahoma Wildlife Services are not likely to adversely affect any of the listed or proposed species. We have reviewed the Biological Assessment transmitted with your correspondence and concur with your determination. Therefore, unless new information reveals effects of the actions that may negatively impact listed species in a manner or to an extent not considered, or a new species or critical habitat is designated that may be affected by the proposed action, no further action pursuant to the Endangered Species Act of 1973, as amended is necessary.

Sincerely,

Jerry Brabander
Field Supervisor

SAH:sh/wslr.wpd

APPENDIX E

BIRD DAMAGE MANAGEMENT (BDM) METHODS AVAILABLE FOR USE OR RECOMMENDATION BY THE OKLAHOMA WILDLIFE SERVICES PROGRAM

NONLETHAL METHODS - NONCHEMICAL

Agricultural Producer and Property Owner Practices

These consist primarily of nonlethal preventive methods that can be implemented and maintained by resource owners. These resource owners/managers may be encouraged to use these methods, based on the level of risk, need, and professional judgement on their effectiveness and practicality. Typically, these methods include cultural methods and habitat modifications.

Cultural Methods

These may include altering planting dates so that crops are not young and more vulnerable to damage when the damage-causing species is present, or the planting of crops that are less attractive or less vulnerable to such species (e.g., wintering geese in western Oklahoma). At feedlots or dairies, cultural methods generally involve modifications to the level of care or attention given to livestock which may vary depending on the age and size of the livestock. Animal husbandry practices include but are not limited to techniques such as night feeding, indoor feeding, closed barns or corrals, removal of spilled grain or standing water, and use of bird proof feeders (Johnson and Glahn 1994). Size or type of livestock feed may be altered; increased feed size may reduce consumption by starlings but may not be cost effective for the producer (Twedt and Glahn 1984).

Environmental/Habitat Modifications

These can be an integral part of BDM. Wildlife production and/or presence is directly related to the type, quality, and quantity of suitable habitat. Therefore, habitat can be managed to reduce or eliminate the production or attraction of certain bird species or to repel certain birds. In most cases, the resource or property owner is responsible for implementing habitat modifications, and WS only provides advice on the type of modifications that have the best chance of achieving the desired effect. Habitat management is most often a primary component of BDM strategies at or near airports to reduce bird aircraft strike problems by eliminating bird nesting, roosting, loafing, or feeding sites. Generally, many bird problems on airport properties can be minimized through management of vegetation and water from areas adjacent to aircraft runways. Habitat management is often necessary to minimize damage caused by egrets and herons that

establish rookery sites during spring and early summer. Bird activity can be greatly reduced at these sites by removing all the trees or selectively thinning the stand. Rookeries often will re-form at traditional sites, and substantial habitat alteration is sometimes the only way to permanently stop such activity at a site (Grant et al. 1995) These same habitat modification strategies are effective in controlling damage from blackbird roosts during the autumn and winter months. (USDA 1997).

Animal Behavior Modification

This refers to tactics that alter the behavior of wildlife to reduce damage. Animal behavior modification may involve use of scare tactics or fencing to deter or repel animals that cause loss or damage (Twedt and Glahn 1982). Some but not all methods that are included by this category are:

- Bird-proof barriers
- Electronic guards
- Propane exploders
- Motion sensitive scare devices
- Pyrotechnics
- Distress Calls and sound producing devices
- Chemical frightening agents
- Repellents
- Scare crows
- Mylar tape
- Eye-spot balloons
- Harassment with a hovercraft
- Harassment with trained dogs

These techniques are generally only practical for small areas. Scaring devices such as distress calls, helium filled eye spot balloons, raptor effigies and silhouettes, mirrors, and moving disks can be effective but usually for only a short time before birds become accustomed and learn to ignore them (Schmidt and Johnson 1984, Bomford 1990, Rossbach 1975, Graves and Andelt 1987, Mott 1985, Shirota et al. 1983, Conover 1982, Arhart 1972). Helium balloons have been shown to produce some results for scaring egrets at forming rookeries, but soon require the integration of other methods to retain their effectiveness (Grant et al. 1995). Mylar tape has produced mixed results in its effectiveness to frighten birds (Dolbeer et al. 1986, Tobin et al. 1988).

Bird proof barriers can be effective but are often cost-prohibitive, particularly because of the aerial mobility of birds which requires overhead barriers as well as peripheral fencing or netting. Exclusion adequate to stop bird movements can also restrict movements of livestock, people and other wildlife (Fuller-Perrine and Tobin 1993). Heavy plastic strips hung vertically in open doorways have been successful in some situations in

excluding birds from buildings used for indoor feeding or housing of livestock (Johnson and Glahn 1994). Plastic strips, however, can prevent or substantially hinder the filling of feed troughs or feed platforms at livestock feeding facilities. Such strips can also be covered up when the feed is poured into the trough by the feed truck. They are not practical for open-air feedlot operations that are not housed in buildings.

Monofilament wires can effectively deter gull use of specific areas where they are causing a nuisance (Blokpoel 1984; Belant and Ickes 1996). The birds apparently fear colliding with the wires and thus avoid flying into areas where the method has been employed. Steel wires have been effectively utilized to deter gulls from preying on salmon fingerlings at the base of dams (Steuber et al. 1995).

Porcupine wire (e.g., Nixalite™, Catclaw™) is a mechanical repellent method that can be used to exclude pigeons and other birds from ledges and other roosting surfaces (Williams and Corrigan 1994). The sharp points inflict temporary discomfort on the birds as they try to land which deters them from roosting. Drawbacks of this method are that some pigeons have been known to build nests on top of porcupine wires, and the method can be expensive to implement if large areas are involved. Electric shock bird control systems are available from commercial sources and, although expensive, can be effective in deterring pigeons and other birds from roosting on ledges, window sills and other similar portions of structures (Williams and Corrigan 1994).

Auditory scaring devices such as propane exploders, pyrotechnics, electronic guards, scare crows, and audio distress/predator vocalizations are effective in many situations for dispersing damage-causing bird species. These devices are sometimes effective but usually only for a short period of time before birds become accustomed and learn to ignore them (Schmidt and Johnson 1984, Bomford 1990, Rossbach 1975, Mott 1985, Shirota et.al. 1983, and Arhart 1972). Williams (1983) reported an approximate 50% reduction in blackbirds at two south Texas feedlots as a result of pyrotechnics and propane cannon use. However, they are often not practical in dairy or feedlot situations because of the disturbance to livestock, although livestock can generally be expected to habituate to the noise. Birds, too, quickly learn to ignore scaring devices if the birds' fear of the methods is not reinforced with shooting or other tactics.

Visual scaring techniques such as use of mylar tape (highly reflective surface produces flashes of light that startles birds), eye-spot balloons (the large eyes supposedly give birds a visual cue that a large predator is present), flags, effigies (scarecrows), sometimes are effective in reducing bird damage. Mylar tape has produced mixed results in its effectiveness to frighten birds (Dolbeer et.al. 1986, and Tobin et.al. 1988). Birds quickly

learn to ignore visual and other scaring devices if the birds' fear of the methods is not reinforced with shooting or other tactics.

Nest Destruction

Nest destruction is the removal of nesting materials during the construction phase of the nesting cycle. This method is used to discourage birds from constructing nests in areas which may create nuisances for home and business owners. Heusmann and Bellville (1978) reported that nest removal was an effective but time-consuming method because problem bird species are highly mobile and can easily return to damage sites from long distances, or because of high populations. Swallows will often attempt to continually rebuild nests in the same locations or nearby after the nests are repeatedly destroyed (P. Robinson, pers commun., 2002). However, this method poses no imminent danger to pets or the public.

Live Traps

Clover, funnel, and common pigeon traps are enclosure traps made of nylon netting or hardware cloth and come in many different sizes and designs, depending on the species of birds being captured. The entrances of the traps also vary greatly from swinging-door, one-way door, funnel entrance, to tip-top sliding doors. Traps are baited with grains or other food material which attract the target birds. WS' standard procedure when conducting pigeon trapping operations is to ensure that an adequate supply of food and water is in the trap to sustain captured birds for several days. Active traps are checked daily, every other day, or as appropriate, to replenish bait and water and to remove captured birds.

Decoy traps are used by WS for preventive and corrective damage management. Decoy traps are similar in design to the Australian Crow Trap as reported by Johnson and Glahn (1994) and McCracken (1972). Live decoy birds of the same species that are being targeted are usually placed in the trap with sufficient food and water to assure their survival. Perches are configured in the trap to allow birds to roost above the ground and in a more natural position. Feeding behavior and calls of the decoy birds attract other birds which enter and become trapped themselves. Active decoy traps are monitored daily, every other day, or as appropriate, to remove and euthanize excess birds and to replenish bait and water. Decoy traps and other cage/live traps, as applied and used by WS, pose no danger to pets or the public and if a pet is accidentally captured in such traps, it can be released unharmed.

Nest box traps may be used by WS for corrective damage management and are effective in capturing local breeding and post breeding starlings and other targeted secondary cavity nesting birds (DeHaven and Guarino 1969, Knittle and Guarino 1976). Nest box traps are effective in capturing local

breeding and post breeding starlings in limited areas (DeHaven and Guarino 1969; Knittle and Guarino 1976). Trapped birds are euthanized. Relocation to other areas following live capture would not generally be effective because problem bird species are highly mobile and can easily return to damage sites from long distances, habitats in other areas are generally already occupied, and relocation would most likely result in bird damage problems at the new location. Translocation of wildlife is also discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal, potential disease transmission, poor survival rates, and difficulties in adapting to new locations or habitats.

Mist nets are more commonly used for capturing small-sized birds such as house sparrows, finches, etc. but can be used to capture larger birds such as ducks and ring-neck pheasants or even smaller nuisance hawks and owls. It was introduced in to the United States in the 1950's from Asia and the Mediterranean where it was used to capture birds for the market (Day et al. 1980). The mist net is a fine black silk or nylon net usually 3 to 10 feet wide and 25 to 35 feet long. Net mesh size determines which birds can be caught and overlapping "pockets" in the net cause birds to entangle themselves when they fly into the net.

Cannon or Rocket nets are normally used for larger birds such as pigeons, feral ducks, and waterfowl and use mortar projectiles to propel a net up and over birds which have been baited to a particular site. This type of net is especially effective for waterfowl that are flightless due to molting and other birds which are typically shy to other types of capture.

Drive traps are simple pen enclosures that have extended sides or "wings" to guide birds into the enclosure. The birds are herded into the trap by persons on foot. This method is generally used to capture waterfowl or other birds that are flightless due to feather molting or behavior.

Bal-chatri traps are small traps used for capturing birds of prey such as hawks and eagles. Live bait such as pigeons, starlings, rodents, etc. are used to lure raptors into landing on the trap (Hygnstrom and Craven 1994) where nylon nooses entangle their feet and hold the bird. The trap is made of chicken wire or other wire mesh material which is formed into a small cage that holds the live bait. The outside top and sides are covered with many nooses consisting of strong monofilament line or stiff nylon string.

Padded leghold traps may be used to capture individual birds at a bait source, or at the top of a pole used for perching. These traps are modified by weakening the springs, and by padding the jaws with rubber or other soft material, as not to injure the bird. These traps are particularly effective in capturing hawks and owls.

Relocation of Captured Birds

Relocation of damaging birds to other areas following live capture generally would not be effective, nor cost-effective. Relocation to other areas following live capture would not generally be effective because problem bird species are highly mobile and can easily return to damage sites from long distances, habitats in other areas are generally already occupied, and relocation would most likely result in bird damage problems at the new location. Translocation of wildlife is also discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal, potential disease transmission, poor survival rates, and difficulties in adapting to new locations or habitats. However, there are exceptions to the rule for relocating birds. Relocation of damaging birds might be a viable solution and acceptable to the public when the birds were considered to have high value such as migratory waterfowl, raptors, or T&E species. In these cases, WS would likely work with other agencies, such as the USFWS and/or ODWC in order to coordinate the capture, transportation, and selection of suitable relocation sites as needed.

Lure Crops/Alternate Foods

When depredations cannot be avoided by careful crop selection or modified planting schedules, lure crops can sometimes be used to mitigate the loss potential. Lure crops are planted or left for consumption by wildlife as an alternative food source. This approach provides relief for critical crops by sacrificing less important or specifically planted fields. Establishing lure crops is sometimes expensive, requires considerable time and planning to implement, and may attract other unwanted species to the area.

NONLETHAL METHODS - CHEMICAL

Taste/Oral Repellents

Methyl anthranilate (MA) is the artificial grape flavoring additive used in foods and soft drinks for human consumption, and could be used or recommended by WS as a bird repellent. MA has been shown to be an effective repellent for many bird species, including waterfowl (Dolbeer et al. 1993). MA may become available for use as a livestock feed additive (Mason et.al. 1984; 1989). It is registered for applications to turf or to surface water areas used by unwanted birds. The material has been shown to be nontoxic to bees (LD_{50} > 25 micrograms/bee[1]), nontoxic to rats in an inhalation study (LC_{50} > 2.8 mg/L[2]), and of relatively low toxicity to fish and other invertebrates. MA is naturally occurring in concord grapes and in the blossoms of several species of flowers and is used not only as a food additive, but also a perfume ingredient (Dolbeer et al. 1992; RJ Advantage, Inc. 1997). It has been listed as "Generally Recognized as Safe" (GRAS) by the U.S. Food and Drug Administration (Dolbeer et al. 1992). Water surface and turf applications of MA are generally considered expensive. For example, the least intensive application rate

required by label directions is 20 lbs. of product (8 lbs. active ingredient) per acre of surface water at a cost of about $64/lb. with retreating required every 3-4 weeks (RJ Advantage, Inc. 1997). An example of the level of expense involved is a golf course in [redacted], NM where it was estimated that treating four watercourse areas would cost in excess of $25,000 per treatment for material alone. Cost of treating turf areas would be similar on a per acre basis. Also, MA completely degrades in about 3 days when applied to water (RJ Advantage, Inc. 1997) which indicates the repellent effect is short-lived. Another potentially more cost effective method of MA application is by use of a fog-producing machine (Vogt 1997). Such chemicals undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before they would be registered by U.S. Environmental Protection Agency (EPA) or the Food and Drug Administration (FDA).

Particulate feed additives have been investigated for their bird-repellent characteristics. In pen trials, starlings rejected grain to which charcoal particles were adhered. If further research finds this method to be effective and economical in field application, it might become available as a bird repellent on livestock feed. Charcoal feed additives have been explored for use in reducing methane production in livestock and should have no adverse effects on livestock, on meat or milk production, or on human consumers of meat or dairy products (Mason et al. 1994).

Anthraquinone, a naturally occurring chemical found in many plant species and in some invertebrates as a natural predator defense mechanism, has shown effectiveness in protecting rice seed from red-winged blackbirds and boat-tailed grackles (Avery et al. 1997). It has also shown effectiveness as a foraging repellent against Canada goose grazing on turf and as a seed repellent against brown-headed cowbirds (Dolbeer et al. 1998). This chemical is not yet registered in the U.S. but may become available at some future date. Compounds extracted from common spices used in cooking and applied to perches in cage tests have been shown repellent characteristics against roosting starlings (Clark 1997).

Mesurol or methiocarb is an insecticide/ molluscicide used to control slugs and snails in a wide range of agricultural situations. Methiocarb has been demonstrated to have excellent bird repellent qualities. APHIS recently registered methiocarb as a deterrent for ravens and crows that destroy eggs of federally-designated threatened or endangered species. Methiocarb in treated eggs acts as an aversion agent to condition ravens or crows to not predate eggs in nests. Birds feeding on treated eggs associate their negative feeding experience with the nest and viable eggs, preventing further damage. It is also registered in several states for bird repellency on blueberries and cherries. In several countries, Mesurol/methiocarb is used

as a bird repellent on corn. Other research indicates repellency potential on grapes, rice, & sorghum (Spectrum 2002, USDA 2002)

Avitrol (4-Aminopyridine), is a chemical frightening agent (repellent) that is effective in a single dose when mixed with untreated baits, normally in a 1:9 ratio. Avitrol, however, is not completely nonlethal in that a small portion of the birds are generally killed (Johnson and Glahn 1994). Prebaiting is usually necessary to achieve effective bait acceptance by the target species. This chemical is registered for use on pigeons, crows, gulls, blackbirds, starlings, and English sparrows in various situations. Avitrol treated bait is placed in an area where the targeted birds are feeding and usually a few birds will consume treated bait and become affected by the chemical. The affected birds then broadcast distress vocalizations and display abnormal flying behavior, thereby frightening the remaining flock away.

Avitrol is a restricted use pesticide that can only be sold to certified applicators and is available in several bait formulations where only a small portion of the individual grains carry the chemical. It can be used during anytime of the year, but is used most often during winter and spring. Any granivorous bird associated with the target species could be affected by Avitrol. Avitrol is water soluble, but laboratory studies demonstrated that Avitrol is strongly absorbed onto soil colloids and has moderately low mobility. Biodegradation is expected to be slow in soil and water, with a half- life ranging from three to 22 months. However, Avitrol may form covalent bonds with humic materials, which may serve to reduce its availability for intake by organisms from water, is nonaccumulative in tissues and rapidly metabolized by many species (Schafer 1991).

Avitrol is acutely toxic to avian and mammalian species, however, blackbirds are more sensitive to the chemical and there is little evidence of chronic toxicity. Laboratory studies with predator and scavenger species have shown minimal potential for secondary poisoning, and during field use only magpies and crows appear to have been affected (Schafer 1991). However, a laboratory study by Schafer et al. (1974) showed that magpies exposed to two to 3.2 times the published Lethal Dose (LD_{50}) in contaminated prey for 20 days were not adversely affected and three American kestrels that were fed contaminated blackbirds for seven to 45 days were not adversely affected. A formal Risk Assessment found no probable risk is expected for pets and the public, based on low concentrations and low hazards quotient value for nontarget indicator species tested on this compound (USDA 1997, Appendix P). Avitrol use in the OK WS program is very limited.

Tactile Repellents

A number of tactile repellent products are on the market that may deter birds from roosting on certain structural surfaces by presenting a tacky or sticky surface that the birds avoid; however, experimental data in support of this claim are sparse (Mason and Clark 1992). The repellency of tactile products is generally short-lived because of dust, and they sometimes cause aesthetic problems and expensive clean-up costs by running down the sides of buildings in hot weather.

Capture Drugs

Alpha-chloralose is a central nervous system depressant used as an immobilizing agent to capture and remove nuisance waterfowl and other birds. It is labor intensive and in some cases, may not be cost effective (Wright 1973, Feare et al. 1981), but is typically used in recreational and residential areas, such as swimming pools, shoreline residential areas, golf courses, or resorts. Alpha-chloralose is typically delivered as a well contained bait in small quantities with minimal hazards to pets and humans; single bread or corn baits are fed directly to the target birds. WS personnel are present at the site of application during baiting to retrieve the immobilized birds. Unconsumed baits are removed from the site following each treatment. Alpha-chloralose was eliminated from more detailed analysis in USDA (1997) based on critical element screening; therefore, environmental fate properties of this compound were not rigorously assessed. However, the solubility and mobility are believed to be moderate and environmental persistence is believed to be low. Bioaccumulation in plants and animal tissue is believed to be low. Alpha-chloralose is used in other countries as an avian and mammalian toxicant. The compound is slowly metabolized, with recovery occurring a few hours after administration (Schafer 1991). The dose used for immobilization is designed to be about two to 30 times lower than the LD_{50}. Mammalian data indicate higher LD_{50} values than birds. Toxicity to aquatic organisms is unknown (Woronecki et al. 1990) but the compound is not generally soluble in water and therefore should remain unavailable to aquatic organisms. Factors supporting the determination of this low potential included the lack of exposure to pets, nontarget species and the public, and the low toxicity of the active ingredient. Other supporting rationale for this determination included relatively low total annual use and a limited number of potential exposure pathways. The agent is currently approved for use by WS as an Investigative New Animal Drug by the FDA rather than a pesticide.

Contraceptives

Nicarbazin is a chemical that is approved by the FDA to control the disease coccidiosis in broiler chickens. When fed to chickens in high concentrations, some of the side effects were a decrease in egg production, and the fertilized eggs that were laid did not hatch. There were no negative

effects to the health of the adult chickens. Researchers at the National Wildlife Research Center (NWRC) are now working to establish doses and delivery systems to use this reproductive inhibitive technology to deal with ever increasing Canada goose populations (USDA 2002).

LETHAL METHODS - MECHANICAL

Egg addling/destruction

Egg addling/destruction is a method of suppressing reproduction in local nuisance bird populations by destroying egg embryos prior to hatching. Egg addling is conducted by vigorously shaking an egg numerous times which causes detachment of the embryo from the egg sac. Egg destruction can be accomplished in several different ways, but the most commonly used methods are manually gathering eggs and breaking them, or by oiling or spraying the eggs with a liquid which covers the entire egg and prevents the egg from obtaining oxygen (see Egg oiling below). Although WS does not commonly use egg addling or destruction, it is a valuable damage management tool and has shown to be effective.

Shooting

Shooting is more effective as a dispersal technique than as a way to reduce bird densities when large numbers of birds are present. Normally shooting is conducted with shotguns or air rifles. Shooting is a very individual specific method and is normally used to remove a single offending bird. However, at times, a few birds could be shot from a flock to make the remainder of the birds more wary and to help reinforce nonlethal methods. Shooting can be relatively expensive because of the staff hours sometimes required (USDA 1997). It is selective for target species and may be used in conjunction with the use of spotlights, decoys, and calling. Shooting with shotguns, air rifles, or rim and center fire rifles is sometimes used to manage bird damage problems when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible. All firearm safety precautions are followed by WS when conducting BDM activities and all laws and regulations governing the lawful use of firearms are strictly complied with. Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training. WS policy requires standard procedures for training, safe use, storage and transportation of firearms as prescribed by the WS Firearms Safety Training Manual (WS Directive 2.615, 05/03/02). The required firearms training is conducted each year by certified instructors. Hands-on firearms proficiency is evaluated in the field and candidates must pass a written exam. Therefore, firearms are handled in a safe manner with consideration given to the proper firearm to be utilized, the target density, backstop and unique field conditions. WS employees who carry firearms

as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the Lautenberg Amendment which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Sport Hunting

Sport hunting is sometimes recommended by WS as a viable damage management method when the target species can be legally hunted. A valid hunting license and other licenses or permits may be required by ODWC and USFWS for certain species. This method provides sport and food for hunters and incurs no costs to the landowner and could, in some cases, be profitable. Sport hunting is occasionally recommended if it can be conducted safely for pigeon damage management around feedlots and dairies and for Canada geese, and other damage causing waterfowl. Sport hunting serves to make remaining birds more wary and responsive to nonlethal harassment techniques.

Traps

Snap traps are modified rat snap traps used to remove individual woodpeckers, starlings, and other cavity use birds. The trap treadle is baited with peanut butter or other taste attractants and/or is attached near the damage area caused by the woodpecker. These traps pose no imminent danger to pets or the public.

LETHAL METHODS - CHEMICAL

All chemicals used by WS are registered as required by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (administered by the EPA and the Oklahoma Department of Agriculture, Food And Forestry (ODAFF) or by the FDA. WS personnel that use restricted-use chemical methods are certified as pesticide applicators by ODA and are required to adhere to all certification requirements set forth in FIFRA and Oklahoma pesticide laws and regulations. Chemicals are only used on private, public, or tribal property sites with authorization from the property owner/manager.

Carbon Dioxide (CO_2)

CO_2 is sometimes used to euthanize birds which are captured in live traps and when relocation is not a feasible option. Live birds are placed in a container such as a plastic 5-gallon bucket or chamber and sealed shut. CO_2 gas is released into the bucket or chamber and birds quickly die after inhaling the gas. This method is approved as a euthanizing agent by the American Veterinary Medical Association. CO_2 gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is used to carbonate beverages for human consumption and is also the gas released by dry ice. The use of CO_2 by

WS for euthanasia purposes is exceedingly minor and inconsequential to the amounts used for other purposes by society.

Egg Oiling

Egg oiling is method of suppressing reproduction of nuisance birds by spraying a small quantity of food grade vegetable oil or mineral oil on eggs in nests. The oil prevents exchange of gases and causes asphyxiation of developing embryos and has been found to be 96-100% effective in reducing hatchability. (Pochop et al. 1998a, 1998b). The method has an advantage over nest or egg destruction in that the incubating birds generally continue incubation and do not renest. The EPA has ruled that use of corn oil for this purpose is exempt from registration requirements under FIFRA. To be most effective, the oil should be applied anytime between the fifth day after the laying of the last egg in a nest and at least five days before anticipated hatching. This method is extremely target specific and is less labor intensive than egg addling.

DRC-1339/Starlicide (3-chloro-p-toluidine hydrochloride).

DRC-1339 is the principal chemical method that would be used for starling and pigeon damage management in the proposed action. For more than 30 years, DRC-1339 has proven to be an effective method of starling, blackbird, gull, and pigeon control at feedlots, dairies, airports, and in urban areas (West et al. 1967, Besser et al. 1967, Decino et al. 1966). Studies continue to document the effectiveness of DRC-1339 in resolving starling problems at feedlots (West and Besser 1976, Glahn 1982, Glahn et al. 1987), and Blanton et al. (1992) reports that DRC-1339 appears to be a very effective, selective, and safe means of urban pigeon population reduction. Glahn and Wilson (1992) noted that baiting with DRC-1339 is a cost-effective method of reducing damage by blackbirds to sprouting rice.

DRC-1339 is a slow acting avicide that is registered with the EPA for reducing damage from several species of birds, including blackbirds, starlings, pigeons, crows, ravens, magpies, and gulls. DRC- 1339 was developed as an avicide because of its differential toxicity to mammals. DRC-1339 is highly toxic to sensitive species but only slightly toxic to nonsensitive birds, predatory birds, and mammals. For example, starlings, a highly sensitive species, require a dose of only 0.3 mg/bird to cause death (Royall et al. 1967). Most bird species that are responsible for damage, including starlings, blackbirds, pigeons, crows, magpies, and ravens are highly sensitive to DRC-1339. Many other bird species such as raptors, sparrows, and eagles are classified as nonsensitive. Numerous studies show that DRC-1339 poses minimal risk of primary poisoning to nontarget and T&E species (USDA 1997). Secondary poisoning has not been observed with DRC-1339 treated baits. During research studies, carcasses of birds which died from DRC-1339 were fed to raptors and scavenger mammals for 30 to 200 days with no symptoms of secondary poisoning

observed (Cunningham et al. 1981). This can be attributed to relatively low toxicity to species that might scavenge on blackbirds and starlings killed by DRC-1339 and its tendency to be almost completely metabolized in the target birds which leaves little residue to be ingested by scavengers. Secondary hazards of DRC-1339 are almost nonexistent. DRC-1339 acts in a humane manner producing a quiet and apparently painless death.

DRC-1339 is unstable in the environment and degrades rapidly when exposed to sunlight, heat, or ultra violet radiation. DRC-1339 is highly soluble in water but does not hydrolyze and degradation occurs rapidly in water. DRC-1339 tightly binds to soil and has low mobility. The half life is about 25 hours, which means it is nearly 100% broken down within a week, and identified metabolites (i.e., degradation chemicals) have low toxicity. Aquatic and invertebrate toxicity is low (USDA 1997). Appendix P of USDA (1997) contains a thorough risk assessment of DRC-1339 and the reader is referred to that source for a more complete discussion. That assessment concluded that no adverse effects are expected from use of DRC-1339.

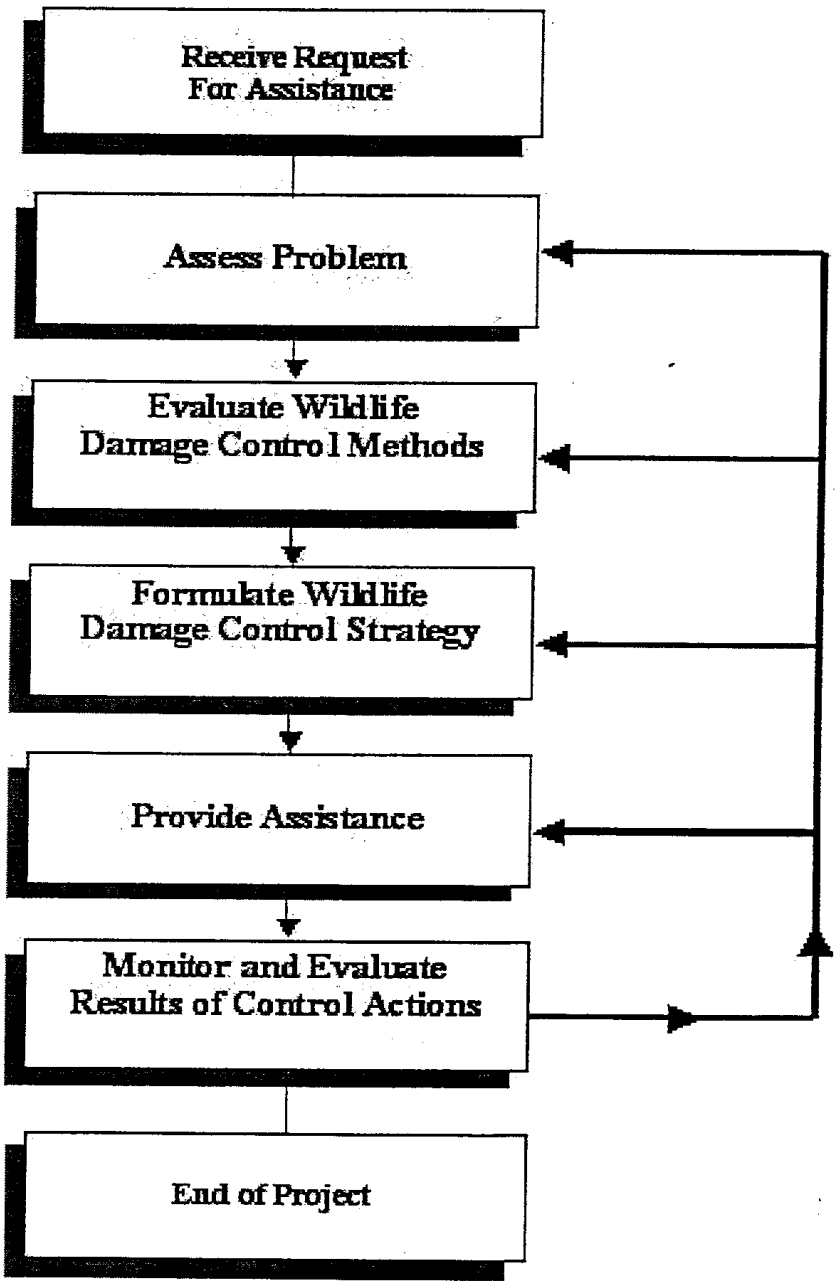
DRC-1339 has several EPA Registration Labels that include use in staging areas (EPA #56228-30), for pigeons (EPA #56228-28), on feedlots (EPA #56228-10), for gulls (EPA #56228-17), and for birds depredating on livestock (EPA #56228-29). The label for staging areas (EPA #56228-30), has been also approved by the ODAFF for use on crows damaging pecans and peanuts in Oklahoma orchards and fields.

[1]An LD_{50} is the dosage in milligrams of material per kilogram of body weight, or, in this case in micrograms per individual bee, required to cause death in 50% of a test population of a species.

[2]An LC_{50} is the dosage in milligrams of material per liter of air required to cause death in 50% of a test population of a species through inhalation.

APPENDIX F

WILDLIFE SERVICES DECISION MODEL



APPENDIX G

Federally Listed Threatened and Endangered Species In Oklahoma as of 08/09/2002

(From USFWS Website, http://ecos.fws.gov/servlet/TESSWebpageUsaLists?state=OK)

Mammals:	
Endangered	Bat, gray (*Myotis grisescens*)
Endangered	Bat, Indiana (*Myotis sodalis*)
Endangered	Bat, Ozark big-eared (*Corynorhinus (=Plecotus) townsendii ingens*)
Birds:	
Endangered	Crane, whooping (except where XN) (*Grus americana*)
Endangered	Curlew, Eskimo (*Numenius borealis*)
Threatened	Eagle, bald (lower 48 States) (*Haliaeetus leucocephalus*)
Threatened	Plover, piping (except Great Lakes watershed) (*Charadrius melodus*)
Endangered	Tern, least (interior pop.) (*Sterna antillarum*)
Endangered	Vireo, black-capped (*Vireo atricapillus*)
Endangered	Woodpecker, red-cockaded (*Picoides borealis*)
Fish:	
Threatened	Cavefish, Ozark (*Amblyopsis rosae*)
Threatened	Darter, leopard (*Percina pantherina*)
Threatened	Madtom, Neosho (*Noturus placidus*)
Threatened	Shiner, Arkansas River (Arkansas R. Basin) (*Notropis girardi*)
Insects:	
Endangered	Beetle, American burying (*Nicrophorus americanus*)
Invertebrates:	
Endangered	Pocketbook, Ouachita rock (*Arkansia wheeleri*)
Endangered	Mussel, scaleshell (*Leptodea leptodon*)
Plants:	
Threatened	Orchid, western prairie fringed (*Platanthera praeclara*)
Reptiles:	
Threatened (Similarity of Appearance)	Alligator, American (*Alligator mississippiensis*)